The Price of Law: The Case of the Eurozone Collective Action Clauses

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We analyze the price effect of the introduction of Collective Action Clauses (CACs) in all newly issued sovereign bonds of Eurozone countries as of January 1, 2013. By allowing a majority of creditors to modify payment obligations, such clauses reduce the likelihood of holdouts while facilitating strategic default by the sovereign. We find that CAC bonds trade in the secondary market at lower yields than otherwise similar no-CAC bonds. The yield differential widens in countries with worse ratings and in those with stronger legal systems. The results suggest that CACs are seen as pro- rather than anti-creditor provisions.
(*JEL classifications:* F33, G12, H63, K12)

> "Collective action clauses . . . are really an international provision that is recommended the world over in case of any and all issuances in order to facilitate crisis management; not to take away, not to be in any shape hostile to a country, but to help it."
>
> *Christine Lagarde, responding to a question about proposed Euro area reforms at the European Parliament (December 2, 2019)*

A key question in both law and finance is how contract provisions as well as contract enforcement matter for the pricing of securities. This question has been tackled extensively in the context of corporate issuers, where it has been shown that contract terms are priced both domestically and internationally (e.g., Qian and Strahan (2007); and Bae and Goyal (2009)) and that the legal framework – both the issuer's jurisdiction and that of the country where contracts are enforced – affects corporate borrowing costs as well as governance (e.g., Doidge, Karolyi and Stulz (2004); and Ball, Hail and Vasvari (2018)). In this context, debt covenants and legal doctrines emerge as substitutes. For example, bonds issued in the US by firms incorporated in countries with stronger creditor rights have fewer covenants (Qi, Roth and Wald (2011)) and the use of restrictive covenants in weak credit protection countries is associated with lower cost of debt (Miller and Reisel (2012)). In a similar spirit, country characteristics such as legal protections for minority investors are found to be complements to firm-level governance in less developed countries, while they are susbtitutes in countries with high enough levels of investor protections (Doidge, Karolyi and Stulz (2007)).

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We bring the question of the pricing of debt covenants and the interrelationship with the legal framework to the sovereign domain. The design of sovereign debt contracts has been at the forefront of the academic and policy debate since the mid-1990s, when CAC provisions specifying the minimum vote to modify payments were introduced into foreign-law bonds issued by emerging market nations as a contractual solution to avoid prolonged and costly battles with holdout creditors following defaults (see Panizza, Sturzenegger and Zettelmeyer (2009); Häseler (2009); Aguiar and Amador (2014)).[1]

Within the context of emerging markets sovereign issuers, the relevance of CACs on the pricing of debt has been extensively discussed. On the one hand, CACs are viewed as pro-creditor provisions as they improve coordination among creditors through a reduction of the holdout problem, thus increasing investors' recoveries in case of sovereign default and ultimately lowering bond yields (e.g., Kletzer (2004); and Haldane, Penalver, Saporta and Shin (2005)). On the other hand, CACs are regarded as anti-creditor provisions since, by making restructuring easier, they encourage opportunistic behavior on the side of the borrower in terms of strategic default and thus lead to higher bond yields (e.g., Dooley (2000); and Shleifer (2003)).

In trying to assess which of these opposing effects matters more for bond pricing, the empirical literature has not yet reached a consensus. Some studies fail to find pricing differences associated with CAC provisions (e.g., Becker, Richards and Thaicharoen (2003) and Richards and Gugiatti (2003)), while others document that their price impact depends on borrowers' creditworthiness. Among these, CACs are associated with lower yields for good quality issuers and higher yields for bad quality issuers (Eichengreen and Mody (2004)), lower yields for bad quality borrowers only (Bradley and Gulati (2014)), or lower yields for middle quality issuers only (Bardozzetti and Dottori (2014)). Although the foregoing empirical studies employ different samples (issuers and time periods, primary or secondary market data), they all share a focus on emerging market nations issuing bonds under foreign law. This bears on the analysis in important ways.

First, there is the matter of how to disentangle the covenant from the jurisdiction, i.e., the CAC provision from the governing law of the contract. Many authors use the latter as a proxy for the presence (or absence) of the former. The typical assumption, made particularly in early papers on the topic, was

[1] The policy debate centered around an IMF proposal for a statutory sovereign debt restructuring mechanism. Failing to achieve consensus, the proposal for a sovereign bankruptcy scheme was shelved and the inclusion of CACs prevailed as the only viable solution to facilitate debt restructuring for emerging countries (Gelpern and Gulati (2009)). The need for a bankruptcy regime for sovereigns (similar to the one that applies to banks and non-financial firms) has recently gained renewed momentum (Bolton (2016)), along with proposals for a more explicit seniority structure (Chatterjee and Eyigungor (2015)).

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that bonds issued by emerging countries under English law had CACs, while those under New York law did not (e.g., Becker, Richards and Thaicharoen (2003); Richards and Gugiatti (2003); and Eichengreen and Mody (2004)). Alternatively, Bardozzetti and Dottori (2014) are able to identify the CAC inclusion, but do not control for the laws under which the contracts were written. However, as shown in Bradley and Gulati (2014), jurisdictions differ in contractual terms other than the inclusion of CACs; and the qualified threshold of creditors required for amending payment terms in the CAC provision displays variation across contracts – even conditioning on the same law. This implies that the nexus between the covenant and the jurisdiction is nuanced: the law governing the bond cannot be taken as a straight proxy for the presence (or absence) of the provision, and the effect of the provision cannot be assessed abstracting from the governing law.

Second, there is the question of how to empirically identify the price impact of CACs. When issuing bonds under foreign law, the vast majority of countries make use of either English or New York law, but rarely both. Thus, even assuming that the applicable foreign law is a valid proxy for CAC provisions, the identification of the pricing effect comes from cross-country variation.

More recently, the empirical literature has focused on the role of the governing law in the pricing of developed countries' bonds. The argument behind these studies is the so-called "local law advantage": domestic-law bonds provide, relative to bonds issued under foreign law, weaker legal protection since the contract terms can, at least in principle, be altered retroactively by passing local legislation. In line with this, Chamon, Schumacher and Trebesch (2018) find that foreign-law bonds issued by eight Eurozone sovereigns with maturity between 2006-2013 trade at a premium, in distressed countries, compared to domestic-law bonds.[2] However, as mentioned above, bonds under foreign laws differ in terms of contractual terms other than CACs (see Bradley and Gulati (2014)), while domestic-law bonds issued by Euro area countries did not contain CAC provisions until 2013 and were identical in other respects other than the variations among the local laws in question. Thus, it is difficult to assess whether the cumulative evidence on the foreign-law premium is the byproduct of the better legal protection embedded in the (foreign) jurisdiction of issuance or stems from the included contract provisions.

[2] Other studies on the role of foreign versus domestic governing law include Choi, Gulati and Posner (2011), which focuses on a single pair of Greek bonds, one issued under English law and the other under domestic law, and Clare and Schmidlin (2014), which compares Eurozone countries (whose debt is issued predominantly under local law) with EU members that do not use the euro (whose debt is issued predominantly under foreign law).

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Our goal in this paper is to study the pricing impact of CACs by making use of a unique event – the introduction of CACs in bonds of Eurozone countries as of January 1, 2013.[3] This initiative mandated the introduction of the *same* clause, which allows modification of the payment obligations subject to the approval of the same qualified majorities of creditors, for all Eurozone countries, irrespective of the characteristics of the issuer and the law governing the issuance. Thus, the question we investigate is whether the mandatory replacement of unanimity of creditors' consensus with a "supermajority voting" may lead to higher borrowing costs to the issuer thus outweighting the benefits of quicker restructuring, or rather the opposite. In this sense, the paper helps shed light on the debate on optimal voting schemes (e.g., Aghion and Bolton (1992); Holden (2005); and Maggi and Morelli (2006)) by providing empirical evidence on the convenience of majority rules as opposed to unanimity of consensus in the context of sovereign debt contracts.

Despite the Euro CACs applying to bonds issued under both foreign and domestic law, we focus our analysis only on the latter. We do this for three reasons. First, we want to keep the domestic law fixed (e.g., German or Irish law) so as to isolate the impact of the mandated CAC provision. Second, Eurozone countries issue the overwhelming majority of bonds under domestic law, while reverting to foreign law bonds only sporadically.[4] By focusing on domestic law, we are therefore able – in contrast with previous studies – to adopt a matching approach whereby we compare bonds with similar characteristics (*including* the law) except the new provision. In particular, given the large number of bonds issued by Eurozone countries under domestic law, we are able to match CAC bonds with no-CAC bonds issued by the same country, under the same law, denominated in the same currency and with almost similar residual maturities. Since other bond-level characteristics are likely to affect yields (e.g., interest rate risk and liquidity risk) we control for these within a standard parametric regression setup. This approach enables us to identify the price effect of CACs *within* countries rather than *across* countries. Finally, focusing on

[3] Article 12(3) of the ESM Treaty stated: "Collective Action Clauses shall be included, as of January 1, 2013, in all new euro area government securities, with maturity above one year, in a way that ensures that their legal impact is identical."

[4] As of this writing, for example, over 99 percent of the debt of the most heavily indebted Eurozone nation, Italy, is under local law (Arnold, Gulati and Panizza (2019)). For the Eurozone countries in our sample, many of whom issue between a half dozen and a dozen sovereign bonds a year, we observe only the following small number of foreign-law bond issuances between January 2013 and June 2014: Austria 0, Belgium 0, Finland 4, France 0, Germany 0, Ireland 0, Italy 0, Luxembourg 0, the Netherlands 0, Portugal 0, Slovakia 6, Slovenia 5, Spain 1 (sources: Bloomberg, Dealogic and Thomson One). Five key countries, i.e., Belgium, France, Germany, Luxembourg, and the Netherlands, did not issue any foreign-law bond in the five years before and five years after January 1, 2013; Ireland issued only 2 in 2017 (with a peculiar 46 and 47 years in maturity), while Finland issued 11 both before and after. The other countries issued a handful of foreign law bonds in seemingly random years.

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domestic (as opposed to foreign) law bonds allows us to examine whether the impact of the CAC reform on yields is a function of the credibility of the legal system under which the contract provision is adopted.

We begin our analysis with a simple model of sovereign lending that illustrates the main trade-off involved in the introduction of CACs between more orderly restructuring in distress and greater incentives for the government to behave strategically.[5] The framework has two main features. First, the sovereign is plagued by the classic "willingness-to-pay-problem", as in Eaton and Gersovitz (1981), due to weak contractual enforcement. Second, bondholders are assumed to be able to coordinate around a debt restructuring agreement only if CACs are embeded in the bond contract.

We show that the yield differential between CAC and no-CAC bonds depends on the likelihood of the sovereign engaging in an *Essential Restructuring* (i.e., restructuring the CAC bonds, while defaulting on the no-CAC bonds) versus a *Strategic Default* (i.e., restructuring the CAC bonds, while honoring the no-CAC bonds). When the former effect dominates, CAC bonds trade at higher prices/lower yields relative to no-CAC bonds, while the opposite is true when the latter is more relevant. Moreover, our model predicts the yield differential between the two types of bonds to be a function of the country rating and other key country characteristics that affect the cost of defaulting for a government – such as the quality of the domestic legal system. In particular, the model predicts that the yield differential between CAC and no-CAC bonds widens (i.e., it becomes more negative) for less creditworthy borrowers and for better legal systems provided that the incentives for the government to behave strategically remain contained.

To test these implications, we compare the secondary market yields of Eurozone bonds issued under domestic law after January 1, 2013 (i.e., bonds with CAC provisions) with those of bonds issued prior to that date (i.e., bonds without CAC provisions).

We find a significant yield differential: our estimates indicate that yields on CAC bonds are, on average, lower by 8 to 18 basis points (bps) than those of matched no-CAC bonds, which translates into larger proceeds by €0.81 to €1.76 bln. Moreover, the yield differential is persistently negative and statistically significant throughout the sample period.

We then turn to test the model's predictions that relate the price impact of CACs to the sovereign's creditworthiness and quality of the legal system by making use of cross-country heterogeneity in credit ratings and quality of law indicators. Consistent with the model, we document that the differential of the

[5] The idea that by relaxing the payment obligations, the borrower may have incentives to default strategically is also present in other contexts such as mortgage delinquency (see, e.g., Mayer, Morrison, Piskorski and Gupta (2014); Scharlemann and Shore (2016); and Gerardi, Herkenhoff, Ohanian and Willen (2017)).

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yield on CAC bonds relative to no-CAC bonds widens in countries with worse ratings and in those with stronger legal systems.

Finally, we consider a falsification exercise where we assume that the Euro CAC initiative took place two years earlier than it actually did. To this end, we compare secondary market yields of pseudo-CAC bonds – i.e., Eurozone bonds issued under domestic law after January 1, 2011 – with those of same-issuer, same-law, same-currency bonds issued prior to that date (i.e., pseudo no-CAC bonds) that have similar residual maturities. Repeating all our analyses on this sample of bonds, we find no evidence of yield differentials across these bonds.

To sum up, we document that CAC provisions in the domestic-law debt issued by Euro area countries are viewed favorably by market participants so that bonds with CACs trade at higher prices (lower yields) than comparable bonds without CACs. We interpret this result as suggesting that the trade-off entailed by CAC provisions in terms of the benefits of more orderly creditor coordination versus the moral hazard costs from strategic default is resolved in favor of the former in our sample countries. Anticipating this, investors are ready to pay higher prices for CAC bonds. The price impact is more pronounced in countries with worse credit worthiness, and thus with a sizable probability of Essential Restructuring and, importantly, with a legal system of good quality. Overall, these findings are consistent with recent papers in the sovereign debt area suggesting that the likelihood of strategic default by sovereigns, and particularly those in the developed world with strong institutions, is low (see Yeyati and Panizza (2011); Collard, Habib and Rochet (2015); and Daniel (2019)).

Our analysis makes use of a legal event that encompasses a series of desirable features that are rare to find: it involves the modification of a single contract clause, this change is exogenous to any individual issuer, and the contracts with the new clause can be compared with otherwise identical (or at least similar) contracts. As such, the Euro CAC initiative constitutes a unique laboratory to address the question of whether, and to which extent, markets price contract terms in the sovereign domain. Our paper is in fact the first to clearly isolate the impact of the contract provision from that of the jurisdiction of issuance and thus to show that the mandatory imposition of supermajority rules in sovereign debt contracts reduces the borrowing costs to the issuer. Our results contribute to the debate on optimal voting schemes (e.g., Aghion and Bolton (1992); Holden (2005); and Maggi and Morelli (2006)) and are informative for the ongoing debate concerning the enhancement of the supermajority rule in Euro area sovereign debt contracts through the introduction of the so-called "single limb" voting, which allows for the aggregation of the votes of creditors across different series of bonds as opposed to the current "dual limb" voting requiring a certain minimum vote to be satisfied in each series of bonds.

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The paper is organized as follows. Section I provides the background on the Euro CAC initiative and sets forth our predictions with the use of a simple model. Section II describes the dataset construction. Section III presents the empirical findings on the average price impact of CAC provisions, while Section IV exploits country heterogeneity. Section V presents some further results in terms of falsification tests. Section VI concludes.

I. Background on the 2013 Euro CAC Initiative and Hypotheses

CACs are contractual provisions that allow for a supermajority of creditors in a single bond series, or across different series of bonds, to vote on modifications of the payment obligations to the debtor in a fashion that binds dissenting creditors. In the context of sovereign bonds, where there is no statutory bankruptcy mechanism, the provisions permit the sovereign and a majority of creditors to agree to a reduction in the amount that the sovereign owes, without facing the problem of holdouts (Eichengreen and Portes (1995)).[6] CACs are therefore a mechanism to ameliorate the inefficiencies caused by intra-creditor conflicts, allowing investors to recover more in the case of a sovereign default (e.g., Haldane, Penalver, Saporta and Shin (2005)).

However, by facilitating restructuring, CACs may also exacerbate the so-called "willingness to pay" problem (e.g., Eaton and Gersovitz (1981)), whereby the sovereign cannot commit to repay creditors even in states of the world where it has the capacity to do so. That is, the sovereign may have an incentive to default strategically; an incentive that is exacerbated as it becomes easier to restructure the debt (e.g., Dooley (2000); and Shleifer (2003)). Given this trade-off, the effect of CACs on bond yields is ambiguous, as it ultimately depends on both the ability of the sovereign to pay and the constraints on strategic default (e.g., domestic institutions such as courts) under which it operates.

While being present in almost all foreign-law sovereign bonds since early 2000s, CACs were largely absent in domestic-law bonds until the 2013 Euro CAC initiative. In this section, we describe the background of this initiative and develop a simple model to derive predictions for our empirical analysis.

A. Euro CAC Initiative

The sovereign debt crisis that hit the Eurozone in 2010-2013 developed in a number of stages culminating in the Greek sovereign debt restructuring. As a result, the Euro area policy makers put in place a number

[6] CACs are particularly important in the sovereign debtor context because of the absence of any bankruptcy system, such as Chapter 11 in the United States, that could perform a similar function of ameliorating the holdout problem.

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of measures including those aimed at ensuring that the resolution of future sovereign debt crises would not be so costly to the Euro system: CAC provisions were a key element of this policy response (Hofmann (2014)).

The 2013 Euro CAC initiative mandated the inclusion of standardized and identical CACs in all new Eurozone sovereign bonds issued after January 1, 2013 with maturities greater than one year. The provisions describe the majorities required to modify the payment terms for a single series of bonds (66.67 percent) as well as a cross-series modification (75 percent across all the series).[7] These CACs apply to all new issues, irrespective of the governing law. In other words, issuers cannot engage in jurisdiction shopping (i.e., issuing under different laws) in order to escape having to use the Euro CACs. In this sense, the Euro CAC initiative engineered what was likely the single biggest change to sovereign bond contract terms ever (Gelpern and Gulati (2013)).[8]

The Euro CAC initiative was intended to ensure private sector involvement in future sovereign restructurings by improving creditor coordination and deterring holdouts (Gelpern and Gulati (2013)). However, it was unclear how the provisions would play out in terms of cost of borrowing given that CACs had the potential to exacerbate the incentives for sovereigns to default strategically. Certain specificities of the Euro area setting might also affect the impact of the Euro CACs. In particular, the sharing of the same currency among countries might induce certain holders of a sovereign's bonds such as other Eurozone sovereigns or institutions to vote in favor of a restructuring proposal in order to avoid disruptive consequences that may affect the value of the currency itself. This should reduce the prospect of holdouts in restructurings of Euro area bonds even more relative to what might happen in the case of CACs in independent countries' debt.[9]

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[7] See *2012 Linklaters, "EU publishes mandatory Collective Action Clause for use in eurozone sovereign bonds from 1 January 2013"*, May.

[8] In shaping the CACs, Euro area policy makers borrowed from a US Treasury department initiative in the early 2000s, which focused on emerging market countries issuing bonds to foreign investors under New York law. The Euro area version of the initiative, however, was more ambitious in three ways. The size was larger (it applied to a multi-trillion dollar market as compared to one that was a few hundred billion), the scope was wider (applied via the local laws of every Euro member nation as opposed to a single one, New York), and the CAC provisions in question were more powerful (applying in an aggregated fashion across a full set of a nation's bonds, as opposed to on a bond-by-bond basis).

[9] As of this writing, in 2020, policy makers in the Euro area are considering enhancing the effectiveness of the existing CACs in Euro area sovereign bonds starting in 2022, so as to further reduce the likelihood of holdout problems in future debt restructurings. Some EU members are however resisting this reform, on the grounds that making it easier for sovereigns to restructure will raise their cost of borrowing at an inopportune moment (Zettelmeyer (2018)).

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B. The Model

We develop a simple two-period (t= 1, 2) framework where a sovereign issues one unit of bonds of either of two types at date 1: bonds without CACs ("no-CAC" bonds) or bonds with them ("CAC" bonds). The two bond types differ in terms of the bondholders' ability to act collectively and negotiate a debt reduction with the sovereign, as we explain below. The sovereign uses the funds to invest in a productive investment returning a stochastic output y at date 2, which is distributed according to the probability distribution function $f(y)$ over $[\underline{y},\overline{y}]$.

Bondholders are assumed, for simplicity, to be risk neutral and their expected return is normalized to zero.[10] The sovereign debt market is perfectly competitive, implying that the sovereign can extract all the surplus at time 1. We denote by D_i the promised repayment on debt issued at date 1, where i = N, C indicates, respectively, no-CAC and CAC bonds. Debt is repaid at date 2 when the output is realized.

The promise to repay D_i is credible if it is in the sovereign's interest to honor its debt obligations ex post. As typical in the literature, we assume that the sovereign repays as a way to avoid the cost that comes with defaulting, which, as in Bolton and Jeanne (2009), is modelled as a proportional output loss representing the loss of reputation and thus of market access during protracted and coordinated legal actions by creditors. Default can be avoided if the sovereign manages to negotiate a debt reduction with the creditors, whose ability to act collectively depends on the type of bonds they hold.[11]

C. The Equilibrium With No-CAC Bonds

No-CAC bonds require unanimous consensus among bondholders for any payment modification and are thus vulnerable to holdouts. For simplicity, we then assume that no-CAC bondholders cannot reach an agreement acceptable to everyone so that no-CAC bonds cannot be renegotiated. It follows that no-CAC bondholders receive either the promised repayment D_N or 0, while the sovereign obtains $y - D_N$ in case of repayment and $(1-\gamma)y$ in case of default with $\gamma > 0$ representing the default cost.

[10] Results are qualitatively similar in the case of risk averse investors.

[11] In what follows, we assume that the sovereign can behave vis a vis its creditors as in the foreign law context. One may ask whether this assumption is justified here given that a sovereign has control of the local law and can, at least in principle, alter it for any bonds where there are too many holdouts. This is what is referred to as the "local law advantage" in the literature and was crucial to the Greek restructuring in 2012 and the Barbados restructuring in 2018 (Buchheit and Gulati (2018)). However, this local law advantage has significant limitations on it, as a function of litigation costs and circumstances when it can be justified as in the case of the Greek restructuring of 2012 (Grund (2017)). Thus, for purposes of the model, we disregard the possibility of using the local law advantage. Rather, given also that we are interested in the yield differential between CAC and no-CAC bonds issued under the same jurisdiction, we focus on the fact that the likelihood of the sovereign behaving strategically will depend only on the size of the parameter γ representing the constraints imposed by the domestic legal system.

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The sovereign chooses the action that maximizes its return at date 2 net of the repayment to bondholders so that it repays the no-CAC debt when:

$$y - D_N \geq (1 - \gamma)\text{y}, \tag{1}$$

It follows that the sovereign repays if $y \geq \frac{D_N}{\gamma}$ and defaults otherwise. Anticipating this, at date 1 no-CAC bondholders require a repayment D_N that satisfies their participation constraint as given by:

$$\int_{\frac{D_N}{\gamma}}^{\overline{y}} D_N f(y)dy = 1. \tag{2}$$

D. The Equilibrium With CAC Bonds

CAC bonds require only a majority of creditors to vote on modifications of payment obligations and thus are less vulnerable to holdouts than no-CAC bonds. This implies that CAC bondholders can coordinate more easily around a debt restructuring agreement and that the likelihood of costly litigation by holdout creditors in case of default is lower. For simplicity, we then assume that CAC bondholders can be coordinated at no cost for the sovereign around a debt restructuring agreement and that default entails a lower cost with CAC bonds than with no-CAC bonds.[12] It follows that the sovereign has three options with CAC debt: repay D_C and obtain $y - D_C$; renegotiate for a payment $\eta \leq D_C$ and obtain $y - \eta$; default incurring a cost $\alpha\gamma y$ and thus obtain $(1 - \alpha\gamma)y$, with $\alpha < 1$.

As before, the sovereign chooses the action that maximizes its return at date 2. Thus, it prefers renegotiating over defaulting if:

$$y - \eta \geq (1 - \alpha\gamma)\text{y}. \tag{3}$$

Bondholders always prefer a positive repayment to a default and, as in Bolton and Jeanne (2009), are modelled as having all the bargaining power in the renegotiation phase. Hence, they set $\eta \leq D_C$ at the level that makes the sovereign indifferent between renegotiating and defaulting, that is:

$$\eta = \alpha\gamma y. \tag{4}$$

Similarly, the sovereign prefers repaying the promised repayment over renegotiating the debt if:

$$y - D_C \geq y - \eta, \tag{5}$$

which, using(4), yields:

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[12] The CAC mechanism enables the debtor and its creditors to be better able to negotiate a settlement in a crisis and, therefore, reduce the costs of disruption by holdouts. This particular feature of CACs is further enhanced by the inclusion of acceleration and reverse acceleration provisions that are part of the supplement to the model Euro CACs. *See* Supplementary Explanatory Note to the Model Collective Action Clause (2012), Subsection I ("strongly" recommending the use of acceleration and reverse acceleration provisions in all Euro area sovereign bonds with CACs), at https://europa.eu/efc/sites/efc/files/supplemental_explanatory_note_on_the_model_cac_-_26_march_2012.pdf.

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$$\alpha\gamma y \geq D_C. \tag{6}$$

It follows that the sovereign repays bondholders if $y \geq \frac{D_C}{\alpha\gamma}$ and renegotiates otherwise. Anticipating this, at date 1 CAC bondholders will require a repayment D_C that satisfies their participation constraint, which, using (4), is given by:

$$\int_{\underline{y}}^{\frac{D_C}{\alpha\gamma}} \alpha\gamma y f(y)dy + \int_{\frac{D_C}{\alpha\gamma}}^{\bar{y}} D_C f(y)dy = 1 \tag{7}$$

E. Comparison of equilibria

Comparing (2) with (7) highlights the role of CAC provisions for bondholders' promised repayments. As illustrated in Figure 1, CACs introduce a trade-off in terms of creditor protection in the case when $\frac{D_C}{\alpha\gamma} > \frac{D_N}{\gamma}$.[13] In the region with a level of output $y \leq \frac{D_N}{\gamma}$, which we define as *Essential Restructuring*, CAC bonds are better than no-CAC bonds in that the ability to coordinate allows CAC bondholders to obtain a positive payment η instead of 0. By contrast, CACs hurt bondholders in the region $y \in [\frac{D_N}{\gamma}, \frac{D_C}{\alpha\gamma}]$), which we define as *Strategic Default*, where the sovereign strategically exploits the possibility of restructuring the CAC debt. It follows that the difference between the promised repayments D_N and D_C will depend on the likelihood of the Essential Restructuring versus the Strategic Default region. We have the following result.

Proposition 1: The promised repayment on CAC bonds is lower than that on no-CAC bonds, i.e., $D_N > D_C$, if and only if:

$$\int_{\underline{y}}^{\frac{D_N}{\gamma}} \alpha\gamma y f(y)dy > \int_{\frac{D_N}{\gamma}}^{\frac{D_C}{\alpha\gamma}} (D_N - \alpha\gamma y) f(y)dy. \tag{8}$$

Proof: See the Appendix.

[13] It is easy to see that for $\frac{D_C}{\alpha\gamma} < \frac{D_N}{\gamma}$ there is no trade-off so that CAC bonds always entail a lower promised repayment than no-CAC bonds.

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The proposition suggests that CAC bonds will carry lower yields than no-CAC bonds when the higher expected repayment that CAC bondholders obtain in the Essential Restructuring region compensates them for the lower expected repayment they obtain in the Strategic Default region where no-CAC bondholders are fully repaid. When this happens, CACs are effective in protecting investors against holdouts, while at the same time containing the risk of strategic defaults.

The relative importance of the Essential Restructuring and Strategic Default regions depends, in turn, on the probability distribution $f(y)$ and the size of the default cost as represented by the parameter γ. We have the following comparative statics result.

Proposition 2: Assume $D_N > D_C$. Then:

i) For a given γ, the difference $D_N - D_C$ increases as the mass of the probability distribution *f(y)* in the Essential Restructuring region (i.e., for $y \in [\underline{y}, \frac{D_N}{\gamma}]$) increases relative to the mass in the Strategic Default region (i.e., for $y \in [\frac{D_N}{\gamma}, \frac{D_C}{\alpha\gamma}]$);

ii) For a given *f(y)*, the difference $D_N - D_C$ increases in the parameter γ if:

$$\int_{\underline{y}}^{\frac{D_C}{\alpha\gamma}} \alpha y f(y) dy > \frac{D_N^2}{\gamma^2} f\left(\frac{D_N}{\gamma}\right). \tag{9}$$

Proof: See the Appendix.

Part (i) of the proposition states that the difference in the promised repayments between no-CAC and CAC bonds increases as the region of Essential Restructuring, where CAC bonds are restructured while no-CAC bonds are defaulted upon, becomes more likely (in terms of output distribution) relative to that of Strategic Default, where CAC bonds are restructured but no-CAC bonds are repaid in full.

Part (ii) of the proposition establishes the condition under which the difference $D_N - D_C$ increases with the parameter γ. The term on the LHS of (9) represents the marginal increase, as γ increases, in the expected payoff CAC bondholders obtain in the regions of Essential Restructuring and Strategic Default. The term on the RHS of (9) represents instead the increased probability of the Strategic Default region as γ increases, where no-CAC bondholders are repaid in full. Thus condition (9) states that the difference $D_N - D_C$ increases with γ when the benefits to CAC bondholders in terms of higher repayments in the Essential Restructuring and Strategic Default regions dominate the higher likelihood of occurence of the Strategic Default region.

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F. Empirical Predictions

Propositions 1 and 2 enable us to generate some empirical predictions concerning the introduction of CACs. In particular, we expect CACs to reduce the cost of debt in countries where the sovereign has enough incentives to avoid behaving strategically. It is in these countries that the CAC provision is most useful in protecting bondholders in the case of Essential Restructuring, i.e., when the output is so low that without CACs the sovereign defaults and bondholders obtain nothing.

We can then characterize the countries where we expect this to occur and in particular, in line with the empirical exercise we conduct, where the effect of CACs on bond yields is more pronounced in terms of the distribution *f(y)* of the sovereign's output and the size of default cost as captured by the parameter γ. We measure the former with the credit rating of a country and the latter with proxies of a country's quality of law. Worse country ratings correspond to more right-skewed output distributions than better ratings, and thus to a higher likelihood of the Essential Restructuring region. Similarly, a better quality of law entails a larger output loss in case of sovereign default, thus corresponding to a larger γ. As in the literature on the role that strong local institutions can play in protecting against expropriation attempts by local governments (North and Weingast (1989); Stasavage (2002); Acemoglu and Johnson (2005); and Breen and McMenamin (2013)), the idea is that countries with better laws and courts will provide better protection to investors against expropriation by the sovereign.

In line with these arguments, we have the following predictions provided that the probability distribution *f(y)* is right-skewed enough and the quality of legal institutions of the country is good enough that the sovereign has a low likelihood of defaulting strategically:

Prediction 1: The yield differential between CAC and no-CAC bonds widens (i.e., becomes more negative) as the sovereign's creditworthiness deteriorates as measured by a worse country rating.

Prediction 2: The yield differential between CAC and no-CAC bonds widens (i.e., becomes more negative) as the quality of law of a country improves.

II. Dataset Description

In our analyses we make use of two samples of bonds: bonds with CAC provisions issued after January 1, 2013 ("CAC bonds"), and bonds without CAC provisions issued before January 1, 2013 that have

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similar characteristics to CAC bonds ("Matched no-CAC bonds"). Our primary source of information is Bloomberg.

CAC bonds are selected according to the following criteria: issued by national governments belonging to the Eurozone as of January 2013 (Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain); denominated in Euro; with issuance between January 1, 2013 and June 30, 2014; with maturity (at issuance) between 1 and 30 years; with strictly positive amount issued; being either zero coupon or having a fixed coupon; noncallable, nonputtable, nonsinking fund, nonconvertible and not inflation linked. At this stage we select 106 bonds issued by 15 Eurozone countries.[14] We further require bonds to be flagged by Bloomberg as including CACs, thus dropping four bonds (three issued by Belgium and one from Malta) for which this data field is missing.[15] We finally resort to the Bloomberg, Dealogic and Thomson One databases to identify the governing law of these bonds, and supplement information from these sources with hand-collected data drawn from the offering circulars and prospectuses. We are able to find the governing law of 93 bonds issued by 14 Eurozone countries,[16] out of which we identify 89 as domestic-law bonds.

To build the sample of matched no-CAC bonds we first identify in Bloomberg the pool of bonds using criteria similar to the ones described above, with the sole exception that we now consider bonds issued before January 1, 2013 that mature after that date. We then retrieve the governing law of these bonds using the three data sources mentioned above, and select local-law bonds only. Again we check that these bonds are not flagged by Bloomberg as having CAC provisions.[17] We perform a matching (without replacement) for each CAC bond with one bond in this pool conditioning on same issuer and same currency, and select the bond with the closest maturity date to that of the CAC bond we consider. For example, we match the 5YR Euro-denominated 1 percent French CAC bond issued on January 28, 2014 (with an International Securities Identification Number equal to FR0011708080, maturity May 25, 2019) with the 15YR Euro-denominated 4.25 percent French no-CAC bond issued on June 10, 2003 (ISIN

[14] There are no bond issuances that meet our criteria for Estonia, while Greece issued only short term bonds, i.e., with maturities less than a year, during our sample period.
[15] The rationale for this filter is to exclude bonds issued after January 1, 2013, but that were operating under a pre-existing MTN and were therefore exempt from the Euro CAC mandate.
[16] We drop bonds issued by Malta because we cannot retrieve their governing law.
[17] In principle, prior to the Euro CAC initiative, sovereigns could have voluntarily included CAC provisions in domestic-law bonds. However, this was almost never the case. From a combination of Bloomberg and our hand coding, we were able to identify only two local-law bonds issued prior to January 1, 2013 with CACs. Both were for a single sovereign, Slovenia.

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FR0000189151, maturity April 25, 2019). Our procedure enables us to form 83 pairs of CAC and matched no-CAC bonds issued by 13 countries.[18]

Table 1 provides the country breakdown at each stage of our data construction procedure. The country split for CAC issuances is in line with that observed for Euro-denominated long-term bonds in previous periods,[19] where Belgium, France, Italy and Spain account for more than 50 percent of issuances. In economic terms, the largest issuers are France, Germany, Italy and Spain, which represent about 80 percent of the total outstanding amount of CAC bonds by the end of 2014. The country breakdown we uncover using CAC bonds' outstanding amount (see the last column in Table 1) is in line with what one obtains using central government long-term debt securities during the last quarter of 2014.

Figure 2 displays the issuance activity (amount at issuance as well as the number of issuances) of CAC bonds between January 2013 and June 2014. Within six months from the inception of the Euro CAC initiative, all countries but Luxembourg had issued at least one bond with CACs. Figure 3 plots the time-series of the outstanding amount (sum of amount at issuance and reopenings) of CAC bonds,[20] both in absolute terms and relative to the overall amount of long-term government debt. Figure 3 reveals that by the end of June 2014 about 13 percent of long-term bonds included the Euro CAC provision.[21] The joint message of Figures 2 and 3 is that CAC bonds have gained importance, over time, in the context of Eurozone sovereign debt markets.

For these CAC bonds we collect from Bloomberg daily mid-yields, prices (mid, ask and bid), amount outstanding and volume,[22] between January 1, 2013 (or the issue date, for bonds issued later than January 1, 2013) and December 30, 2014 (or the maturity date, for bonds maturing before December 30, 2014). For the sample of matched no-CAC bonds we collect the same variables between January 1, 2013 and December 30, 2014 (or the maturity date). We compute Macaulay duration, convexity, and percentage

[18] The matching procedure drops all CAC bonds issued by Cyprus since before 2013 Cyprus issued bonds under English law only. We further discard the 15YR 2.25 percent bond issued by Luxemburg on March 13, 2013 (ISIN LU0905090048) because the only bond we could match it with has a very different maturity (ISIN XS0506445963, maturity date May 18, 2020).

[19] We have identified new issuances of Euro-denominated bonds with zero or fixed coupon and maturity at issuance between 1 and 30 years between January 1, 2009 and June 30, 2010, and get country breakdowns that are similar to those documented in Table 1 for our CAC bonds.

[20] After issuing a new bond, governments can raise additional debt by reopening already existing securities. Reopenings are quite common: during our sample period, 70 (out of 83) CAC bonds have been reopened and, at the end of June 2014, they represent about 60 percent of the aggregate outstanding amount of CAC bonds.

[21] For each country, we define long-term government debt as the sum of general government long-term residual maturities (over 1 year) and short-term residual maturities (up to 1 year), in all currencies (source: *ECB Statistical Data Warehouse*).

[22] Bloomberg contains volume data separately for each exchange where a bond is listed. On average, bonds in our sample are listed on four exchanges, with considerable variation across countries – mean values range from 1.33 exchanges for Slovenian bonds to 9.1 exchanges for German bonds. Turnover is defined as total traded volume (i.e., aggregated across all exchanges) scaled by amount outstanding and winsorized, at the bond level, at the upper 95th percentile since for some bond-weeks turnover figures seemed implausibly high (i.e., well above 80 percent).

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bid-ask spreads from daily prices. We create the variable $Duration_{i,c,t} = Macaulay\ Duration_{i,c,t} - 0.5 \times \frac{Convexity_{i,c,t}}{100}$, which corrects the Macaulay duration by bond convexity.[23] To reduce the measurement error that may contaminate daily data, we carry out our analyses at the weekly level and derive weekly variables as simple averages of daily values, dropping weeks with negative or zero yields.

Table 2 reports descriptive statistics of bond-level variables for the CAC and the matched no-CAC samples. Here, we consider only those weeks where both the CAC bond and the matched no-CAC bond have available bond-level information. To illustrate, we include the 15YR Euro-denominated 4.25 percent French no-CAC bond issued on June 10, 2003 from the fifth week of 2014 onwards, since the CAC bond with similar residual maturity is issued at the end of January 2014. This ensures that our panel dataset has the same number of weekly observations for CAC and matched no-CAC bonds.

The yield differential between CAC and no-CAC bonds is economically small (-2 basis points) and statistically insignificant. On average, CAC bonds carry more interest rate risk (higher duration), while proxies for liquidity risk give a more nuanced picture: CAC provisions are associated with smaller amounts outstanding and lower turnover, and also with narrower bid-ask spreads. These differences in bond-level characteristics between the two groups warrant the risk-adjustments of the bond yields in order to ascertain the effect of CAC provisions – an issue we deal with in Section III.

Finally, as a by-product of our matching procedure, maturities between the two groups of bonds are no longer different. Figure 4 plots the histogram of the absolute distance (in months) between maturities in the two samples. For 50 bond pairs (representing about 60 percent of our sample) the difference in maturities is less than 6 months, and for 69 pairs (representing more than 80 percent of our sample) it is less than one year.

III. CAC Provisions and Yield Differentials

We start by investigating the impact of CAC provisions on bond yields. To this end, we compare the yields of CAC bonds with those of matched no-CAC bonds. Our empirical strategy is to estimate the following random-effects model:

$$log(Yield_{i,c,t}) = Constant + \beta CAC_i + \delta Z_{i,c,t} + \theta_i + \varepsilon_{i,c,t}, \quad (10)$$

[23] In principle, we could include convexity as an additional measure of bond risk. However, in our sample, Macaulay duration and convexity are highly collinear (the linear correlation equals 0.934). We therefore opt for an alternative measure of bond price risk – which we label simply as "duration". Our results are unchanged when using Macaulay duration alone.

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where θ_i is a bond-level random component, $log(Yield_{i,c,t})$ is the log of the mid-yield (in percent) for bond *i* (issued by country *c*) during week *t*,[24] CAC_i is our main variable of interest (an indicator equal to one for a CAC bond and zero for a matched no-CAC bond), and $Z_{i,c,t}$ is a vector of control variables. The vector $Z_{i,c,t}$ includes time (i.e., week) fixed effects that capture co-movement in Eurozone yields, and bond- as well as country-specific variables (definitions of the explanatory variables are collected in Appendix Table A1). We glean these covariates from previous empirical studies on CAC provisions that explore the determinants of yields at launch or in the secondary market (Becker, Richards and Thaicharoen (2003); Richards and Gugiatti (2003); Eichengreen and Mody (2004); Bardozzetti and Dottori (2014); Bradley and Gulati (2014)).

Although we have matched CAC to no-CAC bonds along a number of dimensions (i.e., issuer, currency, fixed rate, governing law, and residual maturity), other bond-level characteristics affect risk and, in turn, yields. As a proxy for bond interest rate risk we include duration ($Duration_{i,c,t}$), which is affected, among others, by the coupon structure. Moreover, since by construction matched no-CAC bonds are off-the-run while CAC bonds are on-the-run,[25] we control for liquidity risk by means of bond $Log\ Amount_{i,c,t}$, i.e., the log of the outstanding amount (in Euro mln), the bid-ask spread (in percent), $Bid-Ask\ Spread_{i,c,t}$, and $Turnover_{i,c,t}$ (exchange-traded volume scaled by amount outstanding). Note that bond size is usually time-varying, at the bond level, due to reopenings. We map country Standard & Poor's long-term issuer credit ratings (observed on Fridays) to a numeric scale and proxy country creditworthiness by means of $Rating_{c,t}$. Higher values indicate worse credit ratings: during our sample period, this variable ranges from 1 (AAA rating) to 12 (BB rating).

The research question that is our focus motivates our choice to use unit-specific (i.e., bond) random effects, as opposed to fixed effects: our variable of interest – the inclusion of CAC provisions – is multicollinear with bond fixed effects. Bae and Goyal (2009) for example offer similar considerations when examining the relation between legal protection and bank loan characteristics in 48 countries: since their variables of interest – creditor and property rights indexes – show little within-unit (i.e., country) variation, they opt for random effects instead of fixed effects which "soak up some of the explanatory power of these slowly changing variables" (*op. cit.*, p. 839). Random effects therefore emerge as a

[24] We take the logarithm of the bond yields to mitigate the effect of potential outliers. However, results in our main analysis are unaffected if we use yields (in level).

[25] The positive yield differential between off- and on-the-run treasuries is well documented for the US market (e.g., Warga (1992) and Pasquariello and Vega (2009)), while we are unaware of similar studies for European sovereigns.

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(partial) remedy to omitted variables, at least those that are uncorrelated with our covariates. We return to the issue of bond-level omitted variables in Section V.

Table 3 reports random-effects (RE) estimation results for several specifications. Standard errors are adjusted for clustering at the level of the matched bonds in the sample. Column 1 in Table 3 refers to the baseline specification (10), and highlights the fact that yields increase with bond-level interest rate risk as well as with issuer credit risk, while liquidity risk measures are overall insignificant. This lack of significance is not surprising in light of the mixed evidence on the role of liquidity for Euro area government bonds: Favero, Pagano and von Thadden (2010) for example find that liquidity differentials are priced only for a subset of EMU countries, while Beber, Brandt and Kavajecz (2009) show that liquidity matters only in times of economic distress.

Turning to our main variable of interest, CAC provisions significantly and negatively affect bond yields.[26] Our estimates indicate that yields on CAC bonds are, on average, around 8 percent lower than those of no-CAC bonds ($= 1 - \exp(-0.084)$). Since the average yield on (matched) no-CAC bonds is equal to 1.7 percent, this corresponds to a reduction in yields by 13 bps or equivalently to an increase in proceeds by €1.34 bln (given that the outstanding amount of CAC bonds by the end of 2014 was equal to €993.49 blns, and assuming that yield reductions in the secondary markets transfer one-to-one to proceeds in the primary market and that the bonds are issued at par in the primary market).

As explained in Section II, our empirical strategy to assess the effect of CAC provisions relies on the identification of a control group. While our matching procedure is carried out on a number of characteristics (issuer, currency, fixed rate, governing law, and residual maturity), as we noted before CAC and no-CAC bonds differ along other dimensions – as Table 2 shows. This begs the question, as to how the (possibly imperfect) quality of the matching procedure affects the finding that CAC provisions reduce yields.

To this end, we first estimate specification (10) – excluding the CAC indicator – between January 1, 2011 and December 31, 2012 for the entire pool of no-CAC bonds which we have previously used to identify our control group (24,590 bond-week observations for 294 unique bonds). Carrying out the estimation outside of our main time window delivers coefficients for the bond-level variables (*Duration*, *Log Amount*, *Bid-Ask Spread*, and *Turnover*) as well as issuer-level creditworthiness (*Rating*) that are not contaminated by our matching. We use the estimated coefficients "out-of-sample" to compute, for

[26] We indicate the corresponding significance levels with a series of stars and, to facilitate the reading of the significance levels for the estimated CAC coefficients, which will be especially convenient in Tables 5, 6, 8 and 9, we also employ corresponding shades of grey.

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our CAC and matched no-CAC bonds, residual (log-)yields as differences between realized and predicted (log-)yields during 2013-2014. Finally, we run a bond-level random-effects regression of these residual (log-)yields on the week fixed effects and the CAC indicator. The point estimate for CAC provisions equals -0.060 with a p-value of 0.001 – which translates into a 10 bps yield reduction or equivalently €0.97 bln in higher proceeds. Thus, we continue to document a statistically significant reduction in yields – although with a somewhat smaller economic magnitude – associated to the inclusion of CACs which reassures us of the matching procedure quality.

We then turn to functional form misspecification concerns which may bias our coefficients, and perform two additional exercises. First, to control for non-linearities arising from bond-level characteristics, we employ bond-level random-effects estimation after augmenting specification (10) with squared and cross-products of all four independent bond-level covariates, involving ten (i.e, four squared plus six cross-products) additional variables in total. Second, to control for the non-linear effects of *all* covariates, we obtain the predicted values of bond (log-)yields from specification (10), and then carry out a bond-level random-effects estimation after adding to the baseline these predicted values raised to the power of two, three, ..., up to eight to the baseline – seven additional variables in total. Columns 2 and 3 in Table 3 report regression results for these two exercises – to save space, we show only the coefficients for those variables included in the baseline specification. The CAC indicator is negative and significant in both columns, although with a somewhat smaller economic magnitude: CAC provisions associate with a yield reduction of 8 to 11 bps (or 5 to 7 percent), or equivalently with €0.81 to 1.11 bln in higher proceeds.

The baseline specification is pooled across all issuers, so that all the coefficients for the control variables are estimated across countries. Thus, the reader may wonder whether cross-country heterogeneity in the response of yields to covariates bears on our findings. Such heterogeneity may manifest both through bond-specific characteristics as well as variables that are common to all Eurozone countries – captured by the week fixed effects. For instance, the empirical findings on the ECB (unconventional) monetary policy are suggestive that yields on sovereign bonds issued by different countries react differently to these interventions, while the response of the yield curve to ECB (conventional) monetary policy is quite homogeneous across countries.[27]

[27] The implementation of the ECB's Securities Markets Programme (SMP) has successfully driven down yields of the countries under the programme, with reductions ranging from -1 to -2bps (Italy) up to -17 to -21bps (Greece) per €1 bln of bond purchases (Eser and Schwaab (2016); and Ghysels, Idier, Manganelli and Vergote (2017)). Altavilla, Giannone and Lenza (2016) document that the ECB Outright Monetary Transactions (OMT) announcements lowered bond yields in Italy and Spain while leaving yields on French and German bonds largely unaffected. The same authors find that a tightening in

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To address these issues, we saturate the baseline specification with the interactions between country fixed effects and bond-level variables (52=13×4 interactions) as well as the interactions between country and time fixed effects (1,339=13×103 interactions).[28] This demanding model, in essence, maintains only one panel restriction, i.e., the CAC indicator. Column 4 in Table 3 reports regression results for the saturated model. Yields continue to be negatively associated with CAC provisions, although both the economic magnitude and the statistical significance of this effect are lower than those documented for the baseline specification: the yield wedge between CAC and matched no-CAC bonds reduces to about 5 percent (significant at the 6 percent level), or equivalently to a 9 bps reduction and a €0.86 bln increase in proceeds.

As an alternative to the random-effects estimation, we use pooled OLS after replacing the bond random components θ_i in specification (10) with bond-*pair* fixed effects. Also in this case we can arrive at an estimate for the coefficient of interest, β, which is robust to omitted variables – although at a higher level of aggregation – correlated with our covariates. Table 3 reports regression results for the baseline equation (column 5), the two specifications that control for non-linear effects (columns 6 and 7), and the saturated model that includes the interactions between country fixed effects and the covariates (column 8). The CAC indicator is always negative and highly significant throughout, with larger magnitudes than those provided by bond-level random-effects estimations: in economic terms, yields on CAC bonds are lower by 10 to 18 bps (6 to 11 percent), and proceeds are larger by €1 to €1.76 bln.

The data-pooling used in panel estimation may mask a time-varying response of bond yields to CAC provisions. To address this matter, we perform OLS cross-sectional regressions for each week. The equation estimated at each time t is the same as in specification (10), dropping the bond random components θ_i and the time fixed effects. We start our analysis from the last week of February 2013 because we have at least 30 observations (15 CAC and 15 matched no-CAC bonds) from then onwards. The adjusted R-squared ranges between 0.63 and 0.95, with an average value of 0.81. The point estimates for the coefficient on the CAC indicator are plotted in Figure 5 (solid blue line) together with their 99 percent confidence intervals (shaded grey area). As the figure reveals, we can exclude the possibility that yields between CAC and no-CAC bonds are identical for a substantial number of cross-sections (70 out

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the stance of euro-area-wide (conventional) monetary policy exerts fairly homogeneous effects on yield curves across countries.

[28] We do not include country fixed effects as well as their interactions with country ratings as these are collinear with the (country × week) interactions.

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of 96 weeks). Overall, the yield differential between CAC and matched no-CAC bonds is persistently negative and highly statistically significant throughout the sample period.

IV. Country Heterogeneity

We now shed light on how the yield differential varies across issuers. Table 4 reports average bond-level characteristics across CAC and matched no-CAC bonds, by country; for comparison, we reproduce, in the bottom row, the averages for the entire sample (from Table 2). We also present average residual log-yields, given by the difference between realized values and those fitted by estimating specification (10) for the entire sample.

Log-yields for CAC bonds are not statistically different from those of matched no-CAC bonds in five countries (Austria, Finland, Italy, the Netherlands, and Spain). In three countries (Portugal, Slovakia, and Slovenia) CAC bonds trade at lower log-yields than no-CAC bonds, while in the remaining five countries (Belgium, France, Germany, Ireland and Luxembourg) the reverse holds. So at a first sight, the latter group of issuers seems to contradict our previous finding of a negative yield differential associated to CAC provisions. However, Table 4 shows also that for all these issuers, CAC bonds have larger durations. In addition, with the sole exception of Luxembourg, they also have smaller sizes, and, with the sole exception of Germany, they have wider (or not significantly different) bid-ask spreads.

Since interest rate and liquidity risk are impounded in bond prices, assessing the price impact of CACs requires risk-adjusting yields. Indeed, looking at the average *residual* log-yields reveals that there is no country where CAC bonds trade at significantly higher yields than no-CAC bonds (comparing columns 6 and 12 in Table 4). The log-yield differential is statistically significant at the 10 percent level (resp., 1 percent level) for ten (resp., eight) issuers that represent about 70 percent (resp., about 63 percent) of the entire sample. And that results in no-CAC bonds overall having higher yields. In light of the model, this evidence suggests that there is a low likelihood of strategic default in our countries of interest and that CACs help providing better protection to bondholders in the case of Essential Restructuring.

Among those issuers with significant yield reductions, the economic magnitude ranges between 5 bps for Germany (average yield on no-CAC bonds equals 1.049 percent) and 58 bps for Portugal (average yield on no-CAC bonds equals 2.430 percent). The associated increase in proceeds ranges between €2.6 mln for Luxembourg and €446.4 mln for Italy. We now turn to disentangling the effect of CAC provisions according to the two variables that the theoretical model highlights as important drivers of the CAC and no-CAC yields (see the empirical predictions in Section I.F): issuer's creditworthiness and quality of the legal system.

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A. CAC Provisions and Creditworthiness

First, we investigate how the CAC vs. no-CAC yield differential changes across the credit ratings spectrum.[29] To this end we add to specification (10) the interaction between the CAC indicator and $Rating_{c,t}$, and estimate:

$$log(Yield_{i,c,t}) = Constant + \beta CAC_i + \rho CAC_i \times Rating_{c,t} + \delta Z_{i,c,t} + \theta_i + \varepsilon_{i,c,t}, \qquad (11)$$

It is worth mentioning that the coefficients on the constitutive terms CAC_i and $Rating_{c,t}$ in the multiplicative model (11) cannot be interpreted as unconditional or average effects. We therefore follow Brambor, Clark and Golder (2006) in making inference from our interaction model.[30] Our interest is in what we label as the "net impact of CAC provisions", which, according to specification (11) is equal to $\beta + \rho Rating_{c,t}$. The coefficient β would therefore be informative of the marginal effect of CACs for the unique case when in which $Rating_{c,t} = 0$ – a case we never observe since we code the best rating, AAA, as $Rating_{c,t} = 1$ and $Rating_{c,t}$ increases with worsening credit quality.[31] What is more, it is possible for the marginal effect of CACs to be significant for a meaningful range of country ratings *even if* the coefficient ρ is insignificant (see Brambor, Clark and Golder (2006), p. 74).

Regression results for specification (11) are in row 1 in Table 5 and include the net effects of CACs (i.e., across the country ratings spectrum we observe in our sample, and the corresponding significance levels which are the outcome of a Wald test of the hypothesis $\beta + \rho Rating_{c,t}$, assessed using a Student t distribution), their standard errors (one line below in brackets), and the percent of bond-week observations for each rating (two lines below in square brackets).

As row 1 in Table 5 reveals, the net effect of CAC provisions is always negative, and its magnitude as well as statistical significance increases as issuer creditworthiness deteriorates: the marginal effect of CACs is significant at the 1 percent level for countries with AA rating or worse (about 75 percent of bond-week observations), where it ranges from a 6.4 percent (rating AA) to a 11.8 percent (rating BB)

[29] The existing empirical literature (e.g., Bardozzetti and Dottori (2014); and Bradley and Gulati (2014), and references cited therein), has dealt with the effect of CAC provisions in foreign-law bonds issued by countries with different creditworthiness, however, reaching mixed results.

[30] Finance applications include Georgarakos and Pasini (2011) for the effect of trust and sociability on stock ownership and Carrieri, Chaieb and Errunza (2013) for the effect of openness and implicit barriers on globalization.

[31] Similarly, the coefficient on country ratings would be revealing of the impact of issuer creditworthiness on (log-)yields of matched no-CAC bonds *only*.

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yield reduction (recall that the table itself reports the estimated coefficients which represent log-yield reductions).

We now investigate non-linearities with respect to issuer rating in the effect of CAC provisions on bond valuation. To this end, we create a binary variable Weak (*Rating*) which equals one when a country rating is equal or below the (approximately) lower quartile value cut-off (i.e., BBB-), and equal to zero otherwise.[32] We then replace the interaction term $CAC_i \times Rating_{c,t}$ in specification (11) with $CAC_i \times Weak\ (Rating)_{c,t}$. The coefficient on the interaction term, ρ, is therefore meaningful to assess significant differences in the net effect of CACs, which are given by β for the strong rating issuers and by the sum $\beta + (\rho * 1) = \beta + \rho$ for the weak rating issuers.

As column 1 in Table 6 reveals, our procedure yields both a one percent-level significant negative interaction effect (null hypothesis, $\rho \geq 0$), and net effects for strong (β=0) and weak countries ($\beta + \rho = 0$). The estimated effects are also economically relevant indicating that in strong countries CACs cut log-yields by 80 bps, in weak countries by 35 bps more.

These findings overall support the model`s prediction that the yield differential between CAC and no-CAC bonds is wider (i.e., more negative) for issuers with worse credit quality, and that there are significant differences between high and low credit risk countries.

B. CAC Provisions and Quality of Law

We now analyze how the yield differential associated with CAC provisions depends on the strength of the legal system. We first screen the empirical literature on legal protection and financial outcomes (most notably Bae and Goyal (2009); Qi, Roth and Wald (2011); Miller and Reisel (2012); and Karolyi (2015), and the references therein) to identify the proxies for a country's quality of law. We select six indicators: the formalism index (Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003); abbreviated as *DLLS*), the judicial efficiency index (La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998); *LLSV(EJ)*), the property rights index (Heritage Foundation; *Heritage*), the law and order index (PRS Group/ICRG Political Risk Rating; *PRS*), and two rule of law indexes (*LLSV(RL)* and World Bank Worldwide Governance Indicator, abbreviated as *World Ban*k). These indicators are broadly related to the quality of law, both in terms of the law on-the-books and law enforcement.[33] In light of the model of Section I.B,

[32] We also check adjacent cut-off values and find similar results. Given the focus on country variation in rating, we cluster standard errors at the country level but findings are similar when clustering at bond-pair level.

[33] Some of these indicators – DLLS, LLSV(EJ) and LLSV(RL) – are, by construction, purely cross-sectional since they are observed only once, while the others are, at least in principle, time-varying. During our sample period, however, only the

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we view these as proxies for the model parameter γ – larger values for γ are associated with better legal systems.

In order to empirically investigate the effect of a country's quality of law on bond yields we add to specification (10) $Quality\ of\ Law_{c,t}$ and its interaction with the CAC indicator, and estimate:

$$log(Yield_{i,c,t}) = Constant + \beta CAC_i + \rho CAC_i \times Quality\ of\ Law_{c,t} + \delta Z_{i,c,t} + \theta_i + \varepsilon_{i,c,t} \qquad (12)$$

where the vector of covariates $Z_{i,c,t}$ includes $Quality\ of\ Law_{c,t}$ on top of all the variables used in specification (10) – week fixed effects, country ratings, and bond-level variables. Regression results are reported in rows 2 to 7 in Table 5, separately for each quality of law measure.[34] According to specification (12), the net effect of CAC provisions is given by $\beta + \rho Quality\ of\ law_{c,t}$, which we report in the table for the values of the quality of law indicator(s) that we observe in our sample. Numbers in square brackets refer to the percentage of the sample (bond-week observations) that falls into each value.

According to the DLLS formalism index, these net effects are significantly negative at the 1 percent level for more than 85 percent of our sample – with the sole exception of the effect associated to the largest value of 5.25 (Spain) which is insignificant – and decrease from left to right. Countries at the lowest end of DLLS values (Ireland) on the right witness the largest (log) yield differential between CAC and matched no-CAC bonds. Since DLLS sorts countries from good to bad, this evidence is consistent with a negative yield differential associated with CAC provisions that widens with the quality of the legal system. Different from DLLS, the other five indicators assign *larger* values to better quality of law countries (so that we use a reversed ordering of their values). The net effects of CACs associated to each of these indicators are always negative and decrease from left to right. These net effects are all significant

World Bank Rule of Law index shows some (little) variation, at the country level, over time. With the sole exception of DLLS, which ranges from good to bad, all indicators assign larger values to countries with better quality of law. DLLS and the LLSV indicators are not available for some countries in our sample – see Panel B in Appendix Table A1 for further details. We also report all actual index values by country, their correlations and the ratings-related variance inflation factors (to assuage any concerns of lack of within-sample variation and multicollinearity) in Appendix Table A2-Panels A to C.

[34] As noted in Subsection IV.A, the coefficient β is informative of the net effect of CACs in a country with $Quality\ of\ law_{c,t} = 0$, a case we never observe in our sample. For the proxies in rows 3 to 6 a value of 0 would indicate a country with extremely low quality of law, which is not observed even in the entire sample of countries for which these proxies are available: the lowest value for LLSV(EJ) is 2.5 (Indonesia), for LLSV(RL) is 1.9 (Sri Lanka), for PRS is 0.83 (Somalia), and for Heritage is 0.5 (North Korea, Turkmenistan and Venezuela). The rule of law index from the World Bank in row 7 takes a value very close to zero for Montenegro (0.007), and reaches its lowest value at -2.45 (Somalia). On the contrary, since DLLS ranges from good to bad, a value of 0 would indicate a country with extremely high quality of law – according to Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003) the best country is Hong Kong with a formalism index of 0.73.

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at the 1 percent level, with the exception of countries with relatively worse quality of law that are significant at the 5 percent level.[35]

Similar to what we have done for country creditworthiness in Subsection IV.A, we also investigate the non-linear effects of issuer quality of law in bond valuation. We replace the continuous variable $Quality\ of\ Law_{c,t}$ in specification (12) – both its direct effect as well as the interaction with the CAC indicator – with the binary variable $Strong\ (Quality\ of\ Law)_{c,t}$, which equals one when a country rating is equal or above the (approximately) higher quartile value cut-off, and equal to zero otherwise.

In columns 2 to 7 of Table 6 both the interactive effect, i.e., the null hypothesis $\rho \geq 0$, and the net effects for weak and strong countries, i.e., the null hypotheses $\beta = 0$ and $\beta + \rho = 0$, is then assessed. In almost all cases the null hypotheses can be rejected, and estimates indicate economic relevancy almost across the board.

In sum, the evidence on the interplay between CAC provisions and the quality of law is consistent with the idea that the incentives to default strategically are weaker in countries with better legal systems.

V. Further Results: Falsification Exercise

One potential concern with the evidence cumulated so far is bond-level omitted variables that are correlated with both CAC provisions and bond yields. To check for the possibility that the relationship between CACs and yields is spurious, we conduct a falsification exercise assuming (wrongly) that the Euro CAC initiative took place on January 1, 2011. Making use of the same filtering criteria detailed in Section II, we identify a placebo sample consisting of 73 bonds issued between January 1, 2011 and June 30, 2012 ("pseudo CAC bonds"), which we match with closest-maturity bonds issued prior to January 1, 2011 ("pseudo no-CAC bonds").[36] Given that the real CAC initiative took place later, the appropriate null hypothesis for our falsification test is that the coefficient of the newly estimated (pseudo) CAC variable equals zero.

We then replicate our analyses using this placebo sample. In Table 7 we report random-effects estimation results for: 1) our baseline specification (10) replacing CAC_i with the pseudo CAC indicator

[35] Finland and the Netherlands are those countries that, across all these quality of law measures, rank invariably at the very top, together with Luxembourg (for which LLSV values are not available). Italy and Slovakia are at the other end of the spectrum for *Heritage*, *PRS* and the *World Bank* proxies; Portugal (resp., Ireland and Spain) ranks worst according to *LLSV(EJ)* (resp., *LLSV(RL)*).

[36] The matching quality (in terms of residual maturities) is fairly similar to the one of CAC and matched no-CAC bonds: about 60 percent of bond pairs (42 out of 73) have residual maturities within 6 months, and about 75 percent (56 out of 73) within one year. Residual maturities are not statistically different between the two groups of bonds.

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(see column 1), and, 2) the saturated model that retains the pseudo CAC indicator as the sole panel restriction, while interacting all other variables with country fixed effects (see column 2). Column 1 corroborates the evidence that bond yields are positively associated with bond-level interest rate risk and country credit risk (see Table 3-column 1). Additionally, it suggests that liquidity risk is priced in bond yields: larger bonds and those with smaller bid-ask spreads have lower yields, while it is worth recalling that these variables were broadly insignificant so far. These findings are contradictory only at a first sight: they are indeed consistent with the evidence in Beber, Brandt and Kavajecz (2009) that liquidity matters only during times of heightened uncertainty – and there is little doubt that the European sovereign debt markets were in turmoil during the years 2011-12.

Most importantly, neither column in Table 7 certifies significant changes in yields associated with the pseudo CAC indicator. We then perform OLS cross-sectional regressions of specification (10) replacing CAC_i with the pseudo CAC indicator, and dropping the bond-specific random components θ_i and the time fixed effects for each week from April 4, 2011 – the first week for which we have 15 bond pairs – to December 28, 2012. Figure 6 depicts the point estimates for the coefficient on the pseudo CAC indicator (solid blue line) together with their 99 percent confidence intervals (shaded grey area). As the figure reveals, the estimates can take either positive or negative values, but crucially we never reject the hypothesis that yields are identical between pseudo CAC bonds and their matched counterparts (which, recall, is the appropriate null hypothesis for our falsification test).

Finally, we make use of cross-country variation in creditworthiness and the quality of the legal system to estimate specifications (11) and (12) after replacing CAC_i with the pseudo CAC indicator. Table 8 reports the net effects of pseudo CAC provisions, while Table 9 shows the corresponding table for the non-linear effects of issuer creditworthiness or quality of law.

Contrary to our findings based on the sample of CAC and matched no-CAC bonds (see Table 5, and its illustrative shading of the estimated coefficients according to their significance levels, as well as Table 6), we fail, overall, to detect significant differences in yields between the two groups of bonds both across the ratings spectrum and the quality of the legal system measures. We conclude that systematic differences between recently issued bonds and older bonds are not confounding the reduction in bond yields associated with CAC provisions that we documented in Sections III and IV.

VI. Conclusion

This paper exploits the Euro Collective Action Clause (CAC) initiative of 2013 to obtain results on a key question in law and finance: are the non-financial contract terms of a bond priced? We ask that question

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in the context of sovereign bonds issued by Euro area countries under domestic law, about one of the most debated and important contract clauses, the CAC. The investigation allows us to disentangle the effects of contract terms from those of the governing law and examine how the effect of contract terms varies depending on the legal framework of the issuer. We find that investors are willing to pay a premium for CAC bonds in the Euro area relative to non-CAC bonds, and more so in countries with worse ratings and more credible legal systems.

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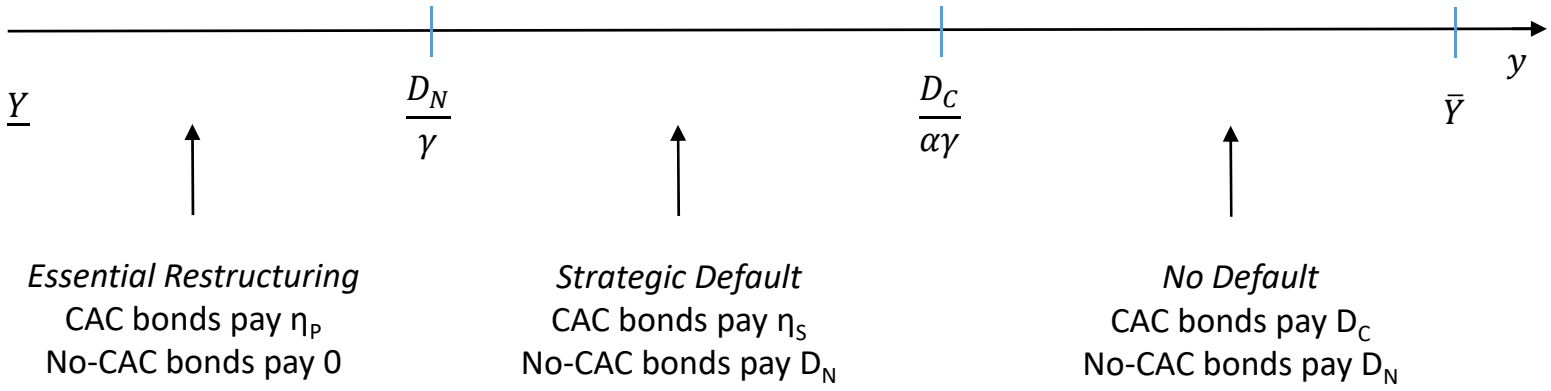

Figure 1
Creditors' repayments
Repayments to no-CAC and CAC bondholders as a function of the sovereign's output *y*.

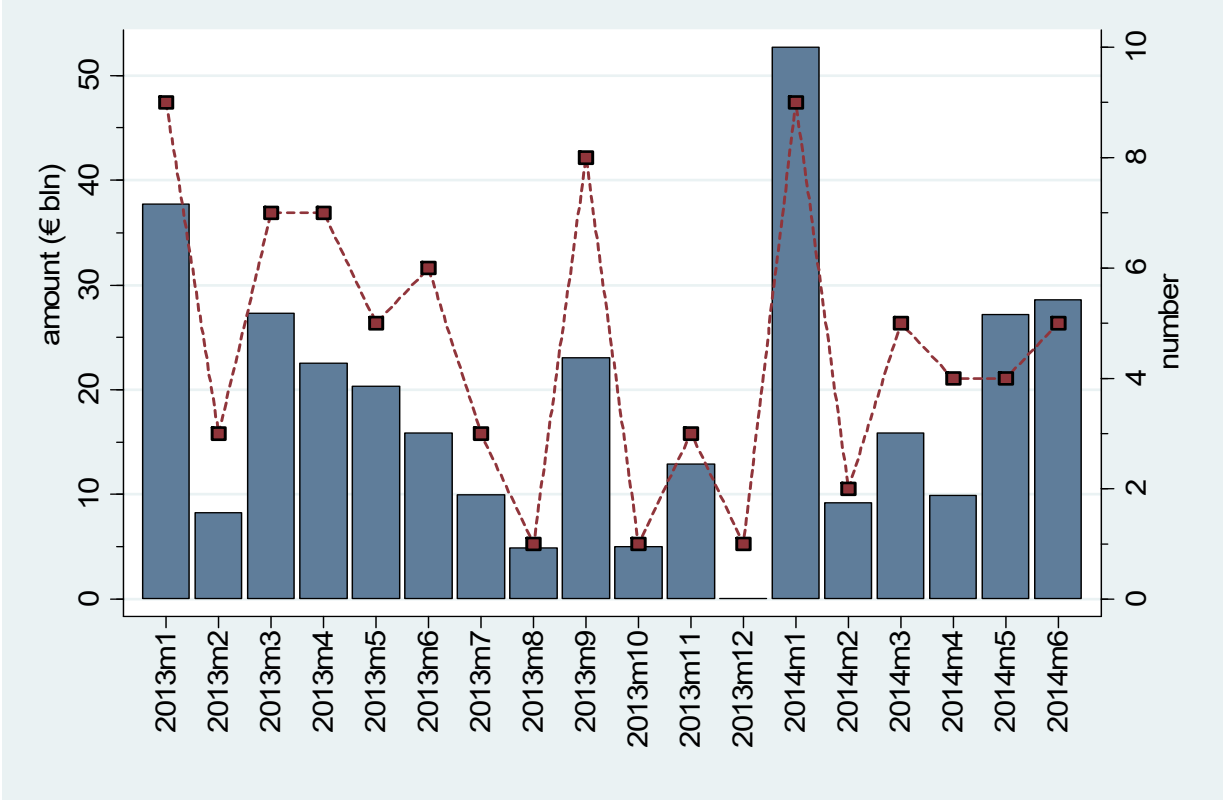

Figure 2
CAC bonds issuances

Monthly time series of CAC bonds new issuances by aggregate amount (blue bars, left vertical axis) and by number of issuances (red squares, right vertical axis). CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years.

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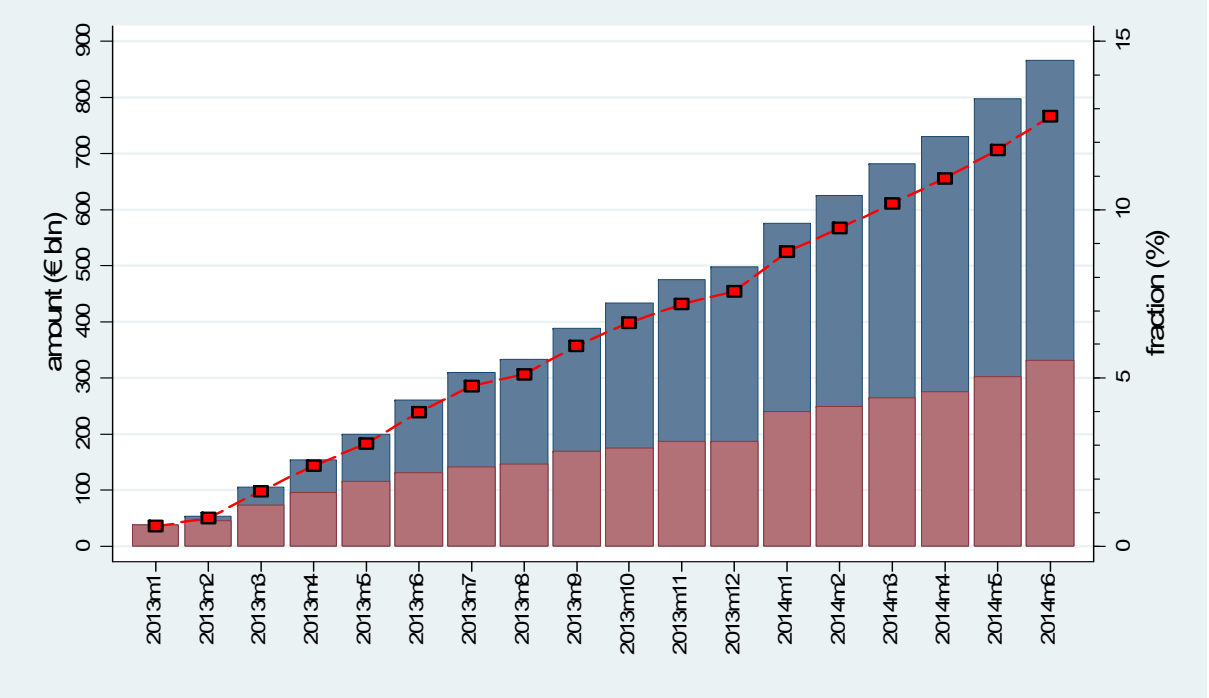

Figure 3

CAC bonds outstanding

Monthly time series of CAC bonds outstanding by aggregate amount (bars, left vertical axis) and by fraction of total long-term government debt outstanding (red squares, right vertical axis). Amount outstanding is split between amount issued (red bars) and amount reopened (blue bars). CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years.

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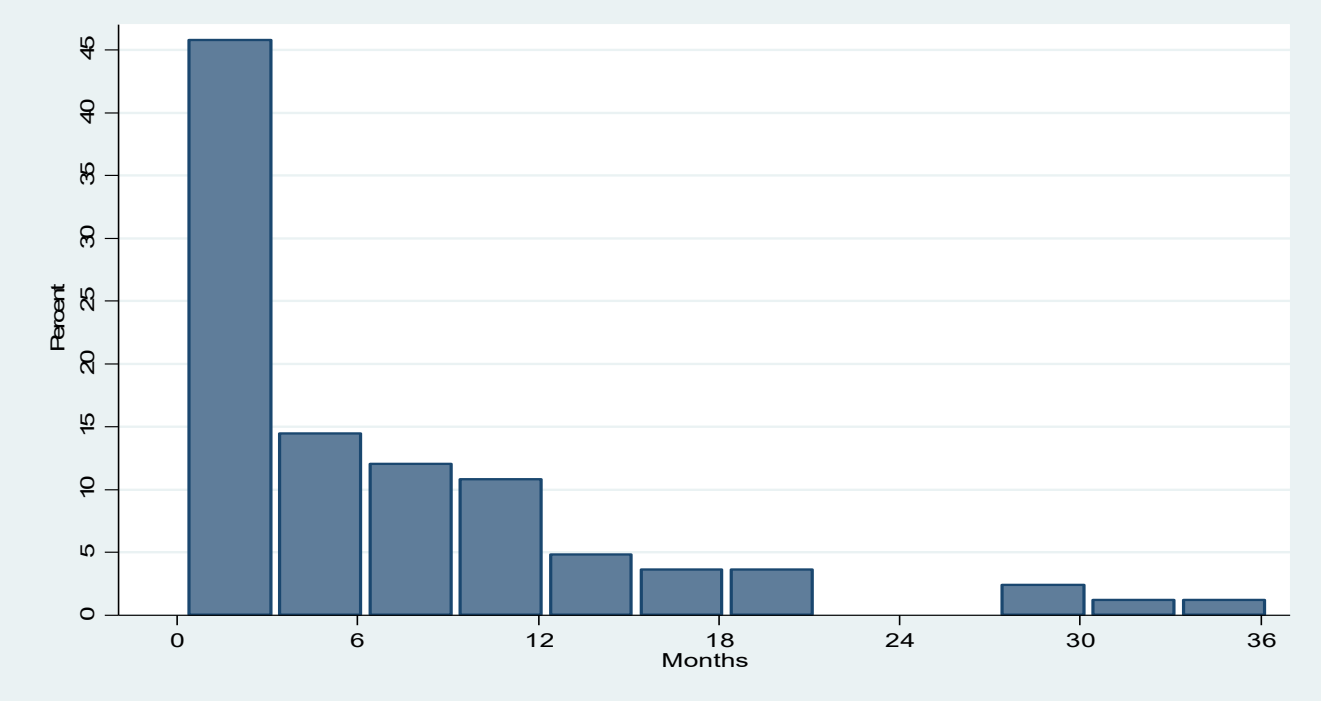

Figure 4

Maturity differential between CAC and matched non-CAC bonds

Histogram of the distance (in absolute value) between CAC and matched no-CAC bonds, expressed in months. CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years. Matched no-CAC bonds are Euro-denominated zero-coupon or fixed coupon bond issued by the same national government under local law prior to January 1, 2013 and have maturities as close as possible to those of CAC bonds.

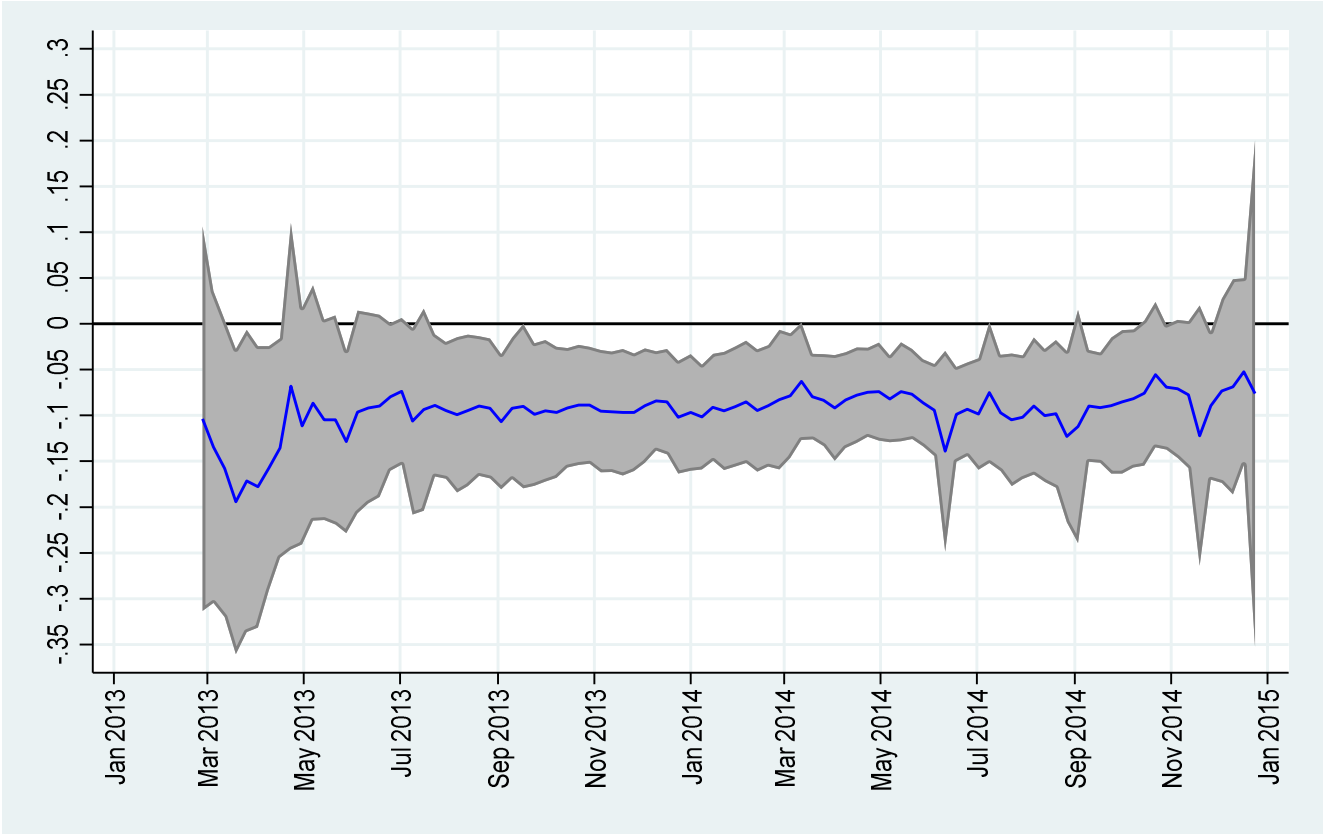

Figure 5
CAC provisions and yield differentials, over time
Point estimates (solid blue line) together with their 99 percent confidence intervals (shaded grey area) of the effect of CAC provisions on yields. The sample ranges from February 25, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). Point estimates are for the CAC indicator from cross-sectional regressions of weekly log-yields on country rating and a series of bond-level controls (duration, size, bid-ask spread, and turnover). Definitions of the explanatory variables are provided in Appendix Table A1.

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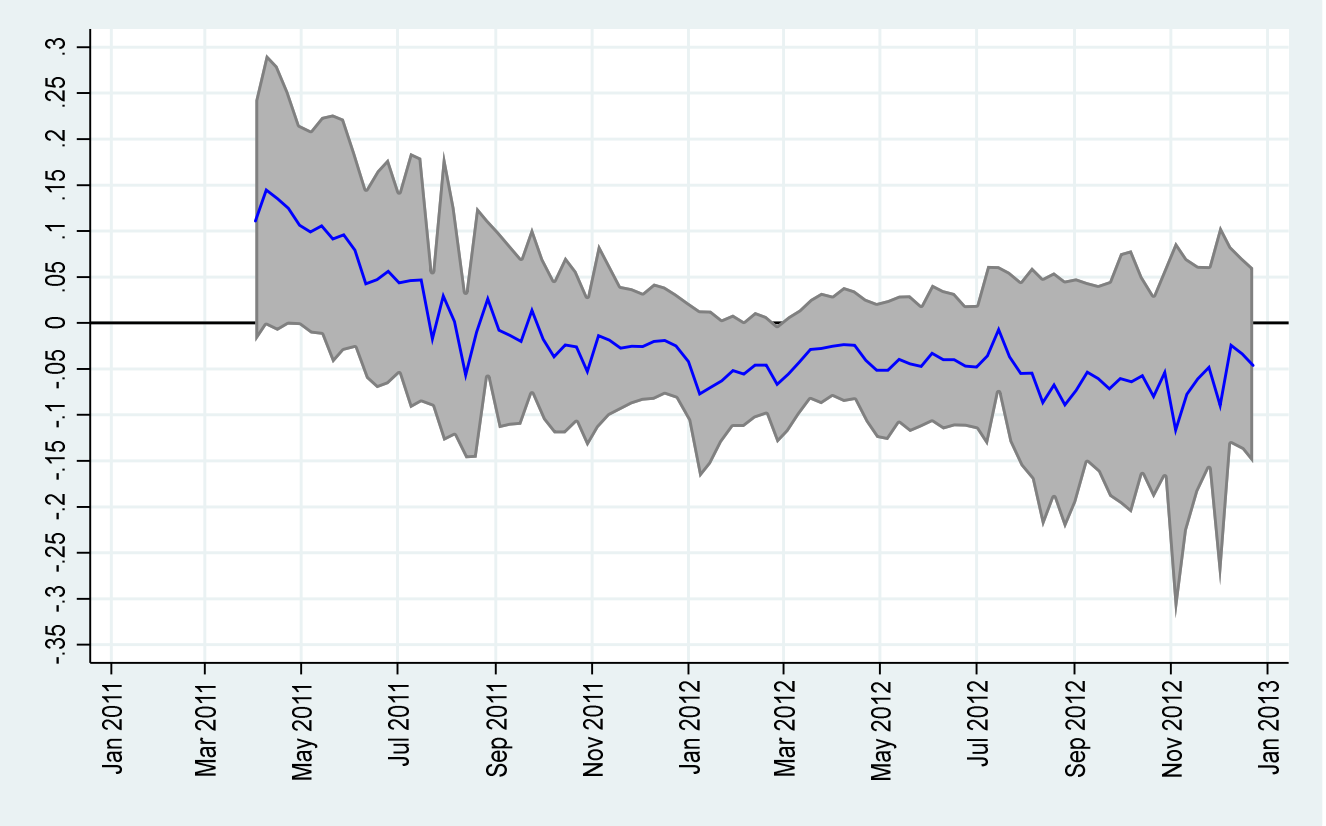

Figure 6

Pseudo CAC provisions and yield differentials, over time (placebo)

Point estimates (solid blue line) together with their 99 percent confidence intervals (shaded grey area) of the effect of Pseudo CAC provisions on yields. The sample ranges from April 4, 2011 to December 28, 2012 and includes 73 bonds issued after January 1, 2011 (Pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched Pseudo no-CAC bonds). Point estimates are for the Pseudo CAC indicator from cross-sectional regressions of weekly log-yields on country rating and a series of bond-level controls (duration, size, bid-ask spread, and turnover). Definitions of the explanatory variables are provided in Appendix Table A1.

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Table 1
Data filtering and country representativeness

Issuer	Initial	CAC provisions	Local law	CAC & Matched no-CAC	Amount (€ bln)
Austria	4	4	4	4	27.35
Belgium	16	13	13	13	47.65
Cyprus	7	7	5	-	-
Finland	3	3	3	3	15
France	10	10	10	10	220.57
Germany	5	5	5	5	90
Ireland	2	2	2	2	13.62
Italy	18	18	18	18	297.57
Luxembourg	2	2	2	1	2
Malta	10	9	-	-	-
the Netherlands	5	5	5	5	76.46
Portugal	6	6	5	5	12.43
Slovakia	4	4	4	4	7.94
Slovenia	4	4	3	3	3.14
Spain	10	10	10	10	179.76
Total	106	102	89	83	993.49

This table describes the country breakdown of bonds at each stage of our data construction process. "Initial" refers to Euro-denominated zero-coupon or fixed coupon bonds issued by national governments in the Eurozone between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years. The remaining columns describe country representativeness after each filter: "CAC provisions" requires bonds to be flagged by Bloomberg as including CACs; "Local law" requires bonds to be local-law bonds; "CAC & Matched no-CAC" requires availability of a comparable no-CAC bond, which is Euro-denominated zero-coupon or fixed coupon bond issued by the same national government under local law prior to January 1, 2013 and with maturity as close as possible to that of the CAC bond. Amount outstanding refers to CAC bonds and is measured at the end of 2014.

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Table 2
Sample overview CAC and no-CAC bonds (bond-level variables)

Variable (unit)	CAC bonds (N=5,476)				Matched no-CAC bonds (N=5,476)				Difference CAC minus no-CAC
	Mean	Median	5th Pct.	95th Pct.	Mean	Median	5th Pct.	95th Pct.	
Yield (%)	1.650	1.450	0.207	3.995	1.669	1.419	0.206	4.034	-0.019
Duration	5.852	6.275	0.969	11.184	5.546	5.684	0.99	10.399	0.305***
Log Amount	8.189	9.119	1.740	9.961	8.647	9.518	3.105	10.242	-0.458***
Bid-Ask Spread (%)	0.138	0.045	0.013	0.649	0.160	0.049	0.014	0.837	-0.022***
Turnover (%)	0.663	0.023	0.000	1.703	0.943	0.005	0.000	2.775	-0.280**
Maturity (yrs)	7.644	7.545	1.496	15.789	7.661	7.323	2.003	15.493	-0.017

This table presents means, medians, 5th and 95th percentiles for our samples of CAC and matched no-CAC bonds. Matched no-CAC bonds have maturities as close as possible to those of CAC bonds. Maturity for CAC bonds is computed at issuance, i.e., the difference between maturity and issue date; for matched no-CAC bonds it is computed as the difference between maturity date and the issuance date of the CAC bond with which the bond is matched. The time period ranges between January 1, 2013 and December 30, 2014. Descriptive statistics for maturity are computed in the cross-section (83 bonds in each sample); for other variables these are computed in the panel, i.e., there are 5,476 bond-week observations in each sample. The last column reports the difference in means between CAC and matched no-CAC bonds together with the t-test statistical significance. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3
CAC provisions and yield differentials

dependent variable: weekly log-yields	Random Effects				Pooled Ordinary Least Squares			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CAC	-0.084***	-0.050***	-0.069***	-0.053*^	-0.112***	-0.062***	-0.079***	-0.097***
	(0.016)	(0.019)	(0.014)	(0.028)	(0.024)	(0.021)	(0.020)	(0.027)
Duration	0.261***	0.473***	0.177***	×	0.360***	1.176***	0.293***	×
	(0.021)	(0.088)	(0.022)		(0.049)	(0.154)	(0.037)	
Log Amount	-0.026	-0.055	-0.012	×	-0.014	-0.013	-0.023***	×
	(0.016)	(0.060)	(0.008)		(0.010)	(0.052)	(0.008)	
Bid-Ask Spread	-0.002	0.813**	-0.007	×	0.049	0.014	0.092	×
	(0.110)	(0.382)	(0.087)		(0.079)	(0.554)	(0.061)	
Turnover	-0.001	0.980	-0.001	×	-0.013	0.592	0.006	×
	(0.035)	(0.791)	(0.037)		(0.035)	(0.563)	(0.016)	
Rating	0.129***	0.154***	0.106***		-0.030	-0.022	0.152***	
	(0.014)	(0.012)	(0.009)		(0.074)	(0.040)	(0.034)	
Bond-level Random Effects	Yes	Yes	Yes	Yes	No	No	No	No
Matched bond-level Fixed Effects	No	No	No	No	Yes	Yes	Yes	Yes
Week Fixed Effects	Yes	Yes	Yes	-	Yes	Yes	Yes	-
Country Fixed Effects x (Bond characteristics)	No	No	No	Yes (×)	No	No	No	Yes (×)
Country x Week Fixed Effects	No	No	No	Yes	No	No	No	Yes
Squared and Cross-Products (SCP) or Fitted Log Yields (FLY)	No	SCP	FLY	No	No	SCP	FLY	No
Observations	10,952	10,952	10,952	10,952	10,952	10,952	10,952	10,952
Bonds	166	166	166	166	166	166	166	166
Adjusted R-squared	0.756	0.790	0.888	0.882	0.884	0.914	0.943	0.924

This table presents bond-level random effects (columns 1-4) and pooled ordinary least squares (columns 5-8) regression results to examine the relation between CAC provisions and bond yields. The sample ranges from January 1, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 with maturities as close as possible to those of CAC bonds (matched no-CAC bonds). CAC equals one if the bond has CAC provisions, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating. Further details on the explanatory variables are provided in Appendix Table A1. Squared and Cross-Products (SCP) include the squared and cross-products of all independent bond-level variables while the Fitted Log Yields (FLY) are the fitted log yields coming from models (1) and (5), respectively, that are included individually raised to the power two, three, ..., and eight. Bond characteristics interacted with country fixed effects in columns 4 and 8 are indicated with ×. Rating is not included in columns 4 and 8 because it is subsumed by the interactions between country and week fixed effects. Effects are either included ("Yes"), not included ("No") or subsumed by other sets of effects ("-"). The table reports the estimated coefficients and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. *** Significant at the 1 percent level.** Significant at the 5 percent level. *^ Significant at the 6 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

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Table 4

Sample overview CAC and no-CAC bonds (bond-level variables) by country

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		CAC bonds						Matched no-CAC bonds						*Difference CAC minus no-CAC*
Country	Number of observations	Log Yield	Duration	Log Amount	Bid-Ask Spread	Turnover	*Residual of Log Yield*	Log Yield	Duration	Log Amount	Bid-Ask Spread	Turnover	*Residual of Log Yield*	
Austria	274	0.185	9.472	8.442	0.099	0.014	*-0.506*	0.236	9.077	9.265***	0.09	0.003***	*-0.331****	***-0.175***
Belgium	928	0.014	6.153	4.188	0.082	2.266	*-0.049*	-0.049*	5.845***	6.997***	0.063***	3.937**	*0.038****	***-0.087***
Finland	206	-0.098	6.891	8.478	0.042	0.394	*0.013*	0.032	6.86	8.560***	0.043	0.243***	*0.153****	***-0.14***
France	562	-0.432	5.737	9.694	0.035	0.148	*-0.188*	-0.554*	5.109***	10.113***	0.037	0.029***	*-0.137*	***-0.051***
Germany	334	0.153	8.23	9.673	0.015	0.044	*-0.042*	-0.066***	7.221***	9.810***	0.021***	0.012***	*0.007****	***-0.048***
Ireland	144	0.917	7.617	8.599	0.197	0.002	*0.002*	0.763***	6.469***	9.203***	0.186	0.001***	*0.163****	***-0.161***
Italy	1,158	0.385	4.597	9.470	0.038	0.693	*0.130*	0.428	4.393*	8.813***	0.127***	0.410***	*0.210****	***-0.08***
Luxembourg	77	0.398	8.061	7.601	0.308	0.001	*0.137*	0.246**	7.022***	6.908***	0.283***	0.001***	*0.239****	***-0.102***
the Netherlands	340	-0.644	5.279	9.276	0.032	0.239	*-0.251*	-0.674	4.818**	9.308	0.031	1.773***	*-0.159**	***-0.092***
Portugal	346	0.197	2.453	7.650	0.333	1.099	*-0.197*	0.447***	2.463	8.713***	0.288**	0.754***	*0.077****	***-0.274***
Slovakia	291	0.716	8.852	7.429	0.92	0.001	*-0.507*	0.797*	9.026	6.637***	1.314***	0.001***	*-0.491*	***-0.016***
Slovenia	103	0.594	3.347	6.941	0.743	0.001	*0.865*	0.974***	4.223***	4.043***	0.084***	0.546***	*0.946**	***-0.081***
Spain	713	0.554	5.246	9.469	0.074	0.113	*0.006*	0.531	5.125	9.822***	0.081	0.063***	*0.024*	***-0.018***
All	5,476	0.178	5.852	8.189	0.138	0.663	*-0.063*	0.174	5.546***	8.647***	0.160***	0.943**	*0.024****	***-0.087***

This table presents means of bond-level variables for our samples of CAC and matched no-CAC bonds, by country. Matched no-CAC bonds have maturities as close as possible to those of CAC bonds. Maturity for CAC bonds is computed at issuance, i.e., the difference between maturity and issue date; for matched no-CAC bonds it is computed as the difference between maturity date and the issuance date of the CAC bond with which the bond is matched. The time period ranges between January 1, 2013 and December 30, 2014. Mean values for maturity are computed in the cross-section (83 bonds in each sample); for other variables these are computed in the panel, i.e., the number of bond-week observations for each sample/country is reported in the second column. Residuals of Log Yields are computed as the difference between log-yields and log-yields predicted from a bond-level random effects model where log-yields are regressed on duration, log amount, bid-ask spread, turnover, country rating, and week fixed effects. The t-test statistical significance is indicated next to mean values of the matched no-CAC sample. Differences in mean maturities are not tested due to the small number of bonds in each country. For Luxembourg the bond amount takes the value of 2,000 (7.601 in log amount) for CAC and the value of 1,000 (7.022 in log amount) for no-CAC bonds and as such we assess it to be different at the 1 percent level. The last column reports the difference in means of residuals of log-yields between CAC and matched no-CAC bonds. The last row reports mean values for the entire panel. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 5
CAC provisions and yield differentials: Country creditworthiness and quality of law

		Variable of Interest (X)												
			Country Rating											
			Maximum			**← Stronger**			**Median**			**Weaker →**		**Minimum**
(1)	Values (of X)	***Rating***			***AAA***	***AA+***	***AA***	***A***	***A-***	***BBB+***	***BBB***	***BBB-***	***BB***	
	Net effect of CAC				-0.052*	-0.059**	-0.066***	-0.086***	-0.092***	-0.099***	-0.106***	-0.113***	-0.126***	
	Standard errors				(0.031)	(0.026)	(0.021)	(0.017)	(0.020)	(0.024)	(0.029)	(0.034)	(0.045)	
	Percent of sample				[12.6%]	[12.1%]	[25.0%]	[5.5%]	[2.8%]	[3.3%]	[24.0%]	[8.4%]	[6.3%]	
			Country Quality of Law											
			Minimum			**← Weaker**			**Median**			**Stronger →**		**Maximum**
(2)	Values (of X)	***DLLS***	***5.25***	***4.26***	***4.04***	***3.93***	***3.56***	***3.52***	***3.51***	***3.23***	***3.14***	***3.07***	***2.73***	***2.63***
	Net effect of CAC		-0.032	-0.075***	-0.084***	-0.089***	-0.105***	-0.107***	-0.107***	-0.119***	-0.123***	-0.126***	-0.141***	-0.145***
	Standard errors		(0.037)	(0.021)	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)	(0.023)	(0.024)	(0.025)	(0.030)	(0.032)
	Percent of sample		[13.8%]	[2.0%]	[22.3%]	[6.7%]	[1.5%]	[5.3%]	[6.4%]	[10.8%]	[4.0%]	[6.6%]	[17.9%]	[2.8%]
(3)	Values (of X)	***LLSV(EJ)***			***5.5***	***6.25***	***6.75***	***8***	***8.75***	***9***	***9.5***	***10***		
	Net effect of CAC				-0.084**	-0.088***	-0.092***	-0.100***	-0.104***	-0.106***	-0.109***	-0.112***		
	Standard errors				(0.041)	(0.031)	(0.025)	(0.018)	(0.021)	(0.023)	(0.029)	(0.035)		
	Percent of sample				[6.9%]	[14.3%]	[23.1%]	[11.2%]	[2.9%]	[6.7%]	[24.0%]	[11.0%]		
(4)	Values (of X)	***LLSV(RL)***				***7.8***	***8.33***	***8.68***	***8.98***	***9.23***	***10***			
	Net effect of CAC					-0.057**	-0.075***	-0.088***	-0.098***	-0.107***	-0.134***			
	Standard errors					(0.027)	(0.020)	(0.017)	(0.017)	(0.019)	(0.030)			
	Percent of sample					[17.1%]	[23.1%]	[6.9%]	[11.2%]	[6.7%]	[34.9%]			
(5)	Values (of X)	***Heritage***					***5***	***6***	***7***	***8***	***9***			
	Net effect of CAC						-0.069**	-0.075***	-0.081***	-0.087***	-0.093***			
	Standard errors						(0.028)	(0.020)	(0.016)	(0.018)	(0.025)			
	Percent of sample						[26.5%]	[1.9%]	[19.3%]	[27.2%]	[25.1%]			
(6)	Values (of X)	***PRS***					***6.67***	***7.5***	***8.33***	***10***				
	Net effect of CAC						-0.059**	-0.072***	-0.085***	-0.111***				
	Standard errors						(0.025)	(0.018)	(0.016)	(0.029)				
	Percent of sample						[26.5%]	[1.9%]	[52.7%]	[19.0%]				
(7)	Values (of X)	***World Bank***	***0.359***	***0.451***	***0.975***	***1.020***	***1.036***	***1.399***	***1.415***	***1.626***	***1.725***	***1.781***	***1.825***	***1.835***	***1.935***
	Net effect of CAC		-0.066**	-0.068***	-0.079***	-0.080***	-0.081***	-0.089***	-0.089***	-0.094***	-0.096***	-0.097***	-0.098***	-0.098***	-0.101***
	Standard errors		(0.027)	(0.025)	(0.017)	(0.016)	(0.016)	(0.018)	(0.018)	(0.022)	(0.024)	(0.025)	(0.026)	(0.026)	(0.028)
	Percent of sample		[21.2%]	[5.3%]	[1.9%]	[13.0%]	[6.3%]	[17.0%]	[10.3%]	[6.1%]	[2.6%]	[1.4%]	[6.2%]	[5.0%]	[3.8%]

This table presents bond-level random effects regression results to examine the net impact of issuer's creditworthiness and quality of law on the relation between CAC provisions and bond yields. The dependent variable ($\log(Yield_{i,c,t})$) is weekly log-yields. The independent control variables (Z) are: CAC, Duration, Log Amount. Bid-Ask Spread, Turnover. As variables of interest (X) we include: Rating or Quality of Law (X), and CAC * Rating or Quality of Law (CAC * X). When X equals the Quality of Law, control variables Z also include Rating. Week fixed effects are also included. The estimated equation is therefore:

$$log(Yield_{i,c,t}) = Constant + \beta CAC_i + \rho CAC_i \times X_{c,t} + \delta Z_{i,c,t} + \theta_i + \varepsilon_{i,c,t}$$

The sample ranges from January 1, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). CAC equals one if the bond has CAC provisions, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., (PASK - PBID)/PMID, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; and Rating is the S&P local currency long term debt issuer rating. As Quality of Law variables are: DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Further details on the explanatory variables are provided in Appendix Table A1. The table reports the net effect of CAC provisions, i.e., $\beta CAC_i + \rho CAC_i * X_{c,t}$, for salient Country Ratings, and for values of the Quality of Law indicators, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. The significance levels on the net effects are the outcome of a Wald test of the hypothesis: H: $\beta + \rho X_{c,t} = 0$, assessed using a Student t distribution. Numbers in square brackets refer to the percentage of the entire sample (bond-week observations) with a given Rating or with a given value of Quality of Law. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels we also employ corresponding shades of grey.

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Table 6
CAC provisions and yield differentials: Country creditworthiness and quality of law (nonlinearities)

dependent variable: weekly log-yields	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Quality of law proxy =	--	*DLLS*	*LLSV (EJ)*	*LLSV (RL)*	*Heritage*	*PRS*	*World Bank*
CAC	-0.080***	-0.047***	-0.082***	-0.084***	-0.076***	-0.074***	-0.077***
	(0.017)	(0.013)	(0.026)	(0.027)	(0.019)	(0.019)	(0.019)
Duration	0.260***	0.272***	0.282***	0.283***	0.262***	0.262***	0.263***
	(0.027)	(0.024)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Log Amount	-0.028	-0.039**	-0.028	-0.028	-0.020	-0.023	-0.025
	(0.022)	(0.020)	(0.023)	(0.022)	(0.024)	(0.023)	(0.024)
Bid-Ask Spread	-0.007	0.165	0.103	0.104	-0.003	-0.002	-0.003
	(0.117)	(0.214)	(0.249)	(0.251)	(0.121)	(0.121)	(0.121)
Turnover	-0.001	-0.004	0.011	0.011	-0.003	-0.003	-0.003
	(0.050)	(0.057)	(0.047)	(0.047)	(0.050)	(0.050)	(0.049)
Rating	0.135***	0.085***	0.117***	0.108***	0.119***	0.122***	0.126***
	(0.016)	(0.031)	(0.024)	(0.035)	(0.018)	(0.016)	(0.016)
Weak (*Rating*)	-0.034						
	(0.141)						
Weak (*Rating*) x CAC	-0.035***						
	(0.012)						
Strong (*Quality of Law*)		-0.501**	-0.192	-0.251	-0.151	-0.148	-0.125
		(0.232)	(0.157)	(0.252)	(0.130)	(0.117)	(0.142)
Strong (*Quality of Law*) x CAC		-0.083***	-0.039	-0.027	-0.027	-0.048**	-0.081***
		(0.023)	(0.043)	(0.041)	(0.028)	(0.027)	(0.022)
Week Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CAC + Weak (*Rating*) x CAC	-0.115***						
	(0.027)						
CAC + Strong (*Quality of Law*) x CAC		-0.130***	-0.120***	-0.111***	-0.103***	-0.123***	-0.158***
		(0.022)	(0.031)	(0.031)	(0.025)	(0.019)	(0.016)
Observations	10,952	10,370	10,010	10,010	10,952	10,952	10,952
Bonds	166	158	150	150	166	166	166
Adjusted R-squared	0.759	0.775	0.777	0.775	0.753	0.755	0.756

This table presents bond-level random effects regression results to examine the net impact of issuer's creditworthiness and quality of law on the relation between CAC provisions and bond yields. The sample ranges from January 1, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). CAC equals one if the bond has CAC provisions, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., (PASK - PBID)/PMID, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Weak (Rating) equals one if the Rating equals BBB- or is below, and equals zero otherwise. Strong (Quality of Law) equals one if the value of DLLS <= 4.04, LLSV (EJ) >= 9.5, LLSV (RL) >= 9.23, Heritage = 9, PRS = 10, or WB >= 1.84, and equals zero otherwise. Further details on the explanatory variables are provided in Appendix Table A1. The table reports the estimated coefficients, and below in parentheses the standard errors that are adjusted for clustering at the country level. For the interaction terms Weak (Rating) x CAC and Strong (Quality of Law) x CAC significance is based on the one sided test for the null that the interaction term is >= 0. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients and their interactions we also employ corresponding shades of grey.

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Table 7
Pseudo CAC provisions and yield differentials (placebo)

dependent variable: weekly log-yields	(1)	(2)
Pseudo CAC	-0.037	-0.024
	(0.030)	(0.026)
Duration	0.163***	×
	(0.026)	
Log Amount	-0.044**	×
	(0.021)	
Bid-Ask Spread	0.195**	×
	(0.079)	
Turnover	-0.084	×
	(0.057)	
Rating	0.201***	
	(0.029)	
Bond-level Random Effects	Yes	Yes
Week Fixed Effects	Yes	-
Country Fixed Effects x (Bond characteristics)	No	Yes (×)
Country x Week Fixed Effects	No	Yes
Observations	9,440	9,440
Bonds	146	146
Adjusted R-squared	0.723	0.836

This table presents bond-level random effects regression results to examine the relation between pseudo CAC provisions and bond yields. The sample ranges from January 1, 2011 to December 30, 2012 and includes 73 bonds issued after January 1, 2011 (pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched pseudo no-CAC bonds). Pseudo CAC equals one if the bond was issued between Jan 2011 and June 2012, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; and Rating is the S&P local currency long term debt issuer rating. Further details on the explanatory variables are provided in Appendix Table A1. Bond characteristics interacted with country fixed effects in column 2 are indicated with ×. Rating is not included in column 2 because it is subsumed by the interactions between country and week fixed effects. Effects are either included ("Yes"), not included ("No") or subsumed by other sets of effects ("-"). The table reports the estimated coefficients and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

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Table 8
CAC provisions and yield differentials: Country creditworthiness and quality of law (placebo)

		Variable of Interest (X)											
			Country Rating										
			Maximum		**← Stronger**			**Median**			**Weaker →**		**Minimum**
(1)	Values (of X)	***Rating***		***AAA***	***AA+***	***AA***	***AA-***	***A***	***A-***	***BBB+***	***BBB***	***BBB-***	***BB***
	Net effect of pseudo CAC			-0.084*	-0.072*	-0.060*	-0.048	-0.036	-0.023	0.001	0.013	0.026	0.050
	Standard errors			(0.046)	(0.041)	(0.036)	(0.033)	(0.030)	(0.028)	(0.029)	(0.032)	(0.035)	(0.045)
	Percent of sample			[23.7%]	[12.2%]	[17.8%]	[2.5%]	[3.6%]	[9.4%]	[24.9%]	[0.1%]	[4.0%]	[1.9%]
			Country Quality of Law										
			Minimum		**← Weaker**			**Median**			**Stronger →**		**Maximum**
(2)	Values (of X)	***DLLS***		***5.25***	***4.04***	***3.93***	***3.56***	***3.52***	***3.51***	***3.23***	***3.14***	***3.07***	***2.73***	***2.63***
	Net effect of pseudo CAC			-0.056*	-0.059**	-0.059*	-0.060	-0.060	-0.060	-0.061	-0.061	-0.061	-0.062	-0.062
	Standard errors			(0.029)	(0.028)	(0.030)	(0.038)	(0.039)	(0.039)	(0.046)	(0.049)	(0.050)	(0.059)	(0.062)
	Percent of sample			[20.9%]	[23.9%]	[3.0%]	[0.9%]	[3.3%]	[5.5%]	[10.3%]	[4.6%]	[9.0%]	[17.6%]	[1.0%]
(3)	Values (of X)	***LLSV(EJ)***			***5.5***	***6.25***	***6.75***	***8***	***8.75***	***9***	***9.5***	***10***		
	Net effect of pseudo CAC				-0.037	-0.045*	-0.050**	-0.062*	-0.070	-0.072	-0.077	-0.082		
	Standard errors				(0.033)	(0.026)	(0.025)	(0.033)	(0.043)	(0.047)	(0.054)	(0.062)		
	Percent of sample				[3.0%]	[21.0%]	[24.2%]	[10.4%]	[1.1%]	[5.6%]	[21.0%]	[13.8%]		
(4)	Values (of X)	***LLSV(RL)***				***7.8***	***8.33***	***8.68***	***8.98***	***9.23***	***10***			
	Net effect of pseudo CAC					-0.049*	-0.057**	-0.062**	-0.067*	-0.071*	-0.082			
	Standard errors					(0.027)	(0.025)	(0.029)	(0.036)	(0.042)	(0.063)			
	Percent of sample					[22.1%]	[24.2%]	[3.0%]	[10.4%]	[5.6%]	[34.8%]			
(5)	Values (of X)	***Heritage***					***5***	***7***	***8***	***9***				
	Net effect of pseudo CAC						0.009	-0.034	-0.055	-0.076				
	Standard errors						(0.019)	(0.028)	(0.037)	(0.047)				
	Percent of sample						[25.9%]	[23.2%]	[27.1%]	[23.8%]				
(6)	Values (of X)	***PRS***						***6.67***	***8.33***	***10***				
	Net effect of pseudo CAC							0.019	-0.043	-0.104**				
	Standard errors							(0.024)	(0.030)	(0.048)				
	Percent of sample							[25.9%]	[55.7%]	[18.4%]				
(7)	Values (of X)	***World Bank***	***0.399***	***0.549***	***1.035***	***1.167***	***1.387***	***1.476***	***1.612***	***1.765***	***1.802***	***1.808***	***1.812***	***1.966***
	Net effect of pseudo CAC		0.015	0.005	-0.028	-0.037	-0.052	-0.058	-0.067*	-0.077*	-0.079*	-0.080*	-0.080*	-0.091*
	Standard errors		(0.020)	(0.020)	(0.026)	(0.029)	(0.034)	(0.037)	(0.040)	(0.045)	(0.046)	(0.046)	(0.046)	(0.050)
	Percent of sample		[22.3%]	[2.6%]	[2.9%]	[20.3%]	[17.1%]	[10.0%]	[5.4%]	[1.0%]	[0.9%]	[3.2%]	[8.8%]	[4.5%]

This table presents bond-level random effects regression results to examine the net impact of issuer's creditworthiness and quality of law on the relation between pseudo CAC provisions and bond yields. The dependent variable ($\log(Yield_{i,c,t})$ is weekly log-yields. The independent control variables (Z) are: pseudo CAC, Duration, Log Amount. Bid-Ask Spread, Turnover. As variables of interest (X) we include: Rating or Quality of Law (X), and pseudo CAC * Rating or Quality of Law (pseudo CAC * X). When X equals the Quality of Law, control variables Z also include Rating. Week fixed effects are also included. The estimated equation is therefore:

$$log(Yield_{i,c,t}) = Constant + \beta pseudo\ CAC_i + \rho pseudo\ CAC_i \times X_{c,t} + \delta Z_{i,c,t} + \theta_i + \varepsilon_{i,c,t}$$

The sample ranges from January 1, 2011 to December 30, 2012 and includes 73 bonds issued after January 1, 2011 (pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched pseudo no-CAC bonds). Pseudo CAC equals one if the bond was issued between January 2011 and June 2012, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., (PASK - PBID)/PMID, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; and Rating is the S&P local currency long term debt issuer rating. As Quality of Law variables are: DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Further details on the explanatory variables are provided in Appendix Table A1. The table reports the net effect of pseudo CAC provisions, i.e., βpseudo $CAC_i + \rho$pseudo $CAC_i * X_{c,t}$, for salient Country Ratings, and for values of the Quality of Law indicators, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. The significance levels on the net effects are the outcome of a Wald test of the hypothesis: H: $\beta + \rho X_{c,t} = 0$, assessed using a Student t distribution. Numbers in square brackets refer to the percentage of the entire sample (bond-week observations) with a given Rating or with a given value of Quality of Law. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. For Chi-squared test: $^{+++}$ Significant at the 1 percent level. To facilitate the reading of the significance levels we also employ corresponding shades of grey.

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Table 9
CAC provisions and yield differentials: Country creditworthiness and quality of law (nonlinearities, placebo)

dependent variable: weekly log-yields	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Quality of law proxy =	--	*DLLS*	*LLSV (EJ)*	*LLSV (RL)*	*Heritage*	*PRS*	*World Bank*
Pseudo CAC	-0.040	-0.053	-0.047	-0.048	-0.015	-0.021	-0.026
	(0.038)	(0.038)	(0.040)	(0.042)	(0.043)	(0.040)	(0.040)
Duration	0.169***	0.164***	0.168***	0.175***	0.172***	0.168***	0.168***
	(0.033)	(0.035)	(0.033)	(0.028)	(0.033)	(0.034)	(0.035)
Log Amount	-0.042**	-0.061**	-0.065**	-0.065**	-0.038*	-0.042**	-0.040**
	(0.019)	(0.029)	(0.031)	(0.027)	(0.022)	(0.021)	(0.020)
Bid-Ask Spread	0.198**	0.206*	0.202*	0.198*	0.197*	0.198*	0.193*
	(0.093)	(0.115)	(0.112)	(0.107)	(0.101)	(0.104)	(0.100)
Turnover	-0.079	-0.083	-0.082	-0.081	-0.095	-0.092	-0.091
	(0.075)	(0.076)	(0.078)	(0.077)	(0.083)	(0.080)	(0.079)
Rating	0.224***	0.196***	0.193***	0.188***	0.192***	0.195***	0.194***
	(0.036)	(0.038)	(0.041)	(0.045)	(0.039)	(0.037)	(0.036)
Weak (*Rating*)	-0.320***						
	(0.111)						
Weak (*Rating*) x Pseudo CAC	0.037						
	(0.034)						
Strong (*Quality of Law*)		-0.147	-0.165	-0.240	-0.206	-0.164	-0.289**
		(0.143)	(0.170)	(0.216)	(0.152)	(0.154)	(0.137)
Strong (*Quality of Law*) x Pseudo CAC		-0.009	-0.033	-0.032	-0.077**	-0.087**	-0.065*
		(0.058)	(0.053)	(0.043)	(0.038)	(0.042)	(0.049)
Week Fixed Effects		Yes	Yes	Yes	Yes	Yes	Yes
Pseudo CAC + Weak (*Rating*) x Pseudo CAC	-0.003						
	(0.045)						
Pseudo CAC + Strong (*Quality of Law*) x Pseudo CAC		-0.062	-0.080	-0.079	-0.093***	-0.109***	-0.092**
		(0.081)	(0.075)	(0.061)	(0.031)	(0.031)	(0.036)
Observations	9,440	9,198	9,116	9,116	9,440	9,440	9,440
Bonds	146	142	140	140	146	146	146
Adjusted R-squared	0.734	0.723	0.721	0.721	0.725	0.724	0.728

This table presents bond-level random effects regression results to examine the net impact of issuer's creditworthiness and quality of law on the relation between pseudo CAC provisions and bond yields. The sample ranges from January 1, 2011 to December 30, 2012 and includes 73 bonds issued after January 1, 2011 (pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched pseudo no-CAC bonds). Pseudo CAC equals one if the bond was issued between January 2011 and June 2012, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Log Amount is the log-amount outstanding; Bid-Ask Spread is the percentage bid-ask spread, i.e., (PASK - PBID)/PMID, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Weak (Rating) equals one if the Rating equals BBB or is below, and equals zero otherwise. Strong (Quality of Law) equals one if the value of DLLS <= 4.04, LLSV (EJ) >= 9.5, LLSV (RL) >= 9.23, Heritage = 9, PRS = 10, or WB >= 1.81, and equals zero otherwise. Further details on the explanatory variables are provided in Appendix Table A1. The table reports the estimated coefficients, and below in parentheses the standard errors that are adjusted for clustering at the country level. For the interaction terms Weak (Rating) x Pseudo CAC and Strong (Quality of Law) x Pseudo CAC significance is based on the one sided test for the null that the interaction term is >=0. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated Pseudo CAC coefficients and their interactions we also employ corresponding shades of grey.

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APPENDIX

Proof of Proposition 1: The proposition follows easily from equating (2) and (7). Given $\frac{D_C}{\alpha\gamma} > \frac{D_N}{\gamma}$, after rearranging the terms, we obtain:

$$\int_{\frac{D_C}{\alpha\gamma}}^{\bar{y}}(D_N - D_C)f(y)dy = \int_{\underline{y}}^{\frac{D_N}{\gamma}} \alpha\gamma y f(y)dy \; + \int_{\frac{D_N}{\gamma}}^{\frac{D_C}{\alpha\gamma}}(\alpha\gamma y - D_N)f(y)dy\,.$$

Thus, $D_N - D_C > 0$ if (8) holds, as in the proposition. ■

Proof of Proposition 2: Part i) of the proposition follows directly from inspection of (8). An increase in the mass of f(y) in the region $y \in [\underline{y}, \frac{D_N}{\gamma}]$ relative to the region $y \in [\frac{D_N}{\gamma}, \frac{D_C}{\alpha\gamma}]$ would simply increase the LHS relative to the RHS of (8), thus enlarging the difference $D_N - D_C$.

For part (ii) of the proposition, we first need to derive how D_N and D_C vary with γ. From (2) and (7) we derive the following implicit functions F_N and F_C:

$$F_N(D_N, \gamma) = \int_{\frac{D_N}{\gamma}}^{\bar{y}} D_N f(y)dy - \; 1 = 0, \tag{P.1}$$

$$F_C(D_C, \gamma) = \int_{\underline{y}}^{\frac{D_C}{\alpha\gamma}} \alpha\gamma y f(y)dy + \int_{\frac{D_C}{\alpha\gamma}}^{\bar{y}} D_C f(y)dy - 1 = 0. \tag{P.2}$$

Using the Implicit Equation Theorem, we derive:

$$\frac{dD_N}{d\gamma} = -\frac{\partial F_N/\partial\gamma}{\partial F_N/\partial D_N} = -\frac{\frac{D_N^2}{\gamma^2} f\left(\frac{D_N}{\gamma}\right)}{\int_{\frac{D_N}{\gamma}}^{\bar{y}} f(y)dy - \frac{D_N}{\gamma} f\left(\frac{D_N}{\gamma}\right)} < 0 \tag{P.3}$$

if $\int_{\frac{D_N}{\gamma}}^{\bar{y}} f(y)dy - \frac{D_N}{\gamma} f\left(\frac{D_N}{\alpha\gamma}\right) > 0$; and, after rearranging terms,

$$\frac{dD_C}{d\gamma} = -\frac{\partial F_C/\partial\gamma}{\partial F_C/\partial D_C} = -\frac{\int_{\underline{y}}^{\frac{D_C}{\alpha\gamma}} \alpha y f(y)dy}{\int_{\frac{D_C}{\alpha\gamma}}^{\bar{y}} f(y)dy} < 0. \tag{P.4}$$

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It follows that the difference $D_N - D_C$ increases with γ if the expression in (P.4) is larger in absolute value than the expression in (P.3). Considering that an increase in the expected repayment D_i benefits no-CAC bondholders more than CAC bondholders given $D_N > D_C$ and $\frac{D_C}{\alpha\gamma} > \frac{D_N}{\gamma}$ (i.e., $\partial F_N/\partial D_N > \partial F_C/\partial D_C$), a sufficient condition for $D_N - D_C$ to be increasing in γ is that $\partial F_C/\partial\gamma > \partial F_N/\partial\gamma$ as stated in (9). Part (ii) of the proposition follows. ■

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Appendix Table A1
Definition of variables

Panel A: Main variables

Variable	Description	Unit/Scale
CAC	=1 if bond has CAC provisions, =0 otherwise	0/1
Pseudo CAC	=1 if bond issued between Jan 2011 and June 2012, =0 otherwise	0/1
Duration	Macaulay Duration-0.5×(Convexity/100)	-
Log Amount	Log-amount outstanding	Mln € (log)
Bid-Ask Spread	Percentage bid-ask spread $(P_{ASK}-P_{BID})/P_{MID}$	%
Turnover	Traded volume across exchanges /Amount outstanding	Decimals
Rating	S&P local currency LT debt issuer rating	1(AAA) to 12(BB)

Panel B. Quality of law proxies

Variable name	*Acronym*	Description	Source	Min-max sample values [country code]
Formalism Index	*DLLS*	Substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts.» (7 point scale, good to bad). Not available for Slovakia.	Djankov, La Porta, Lopez-de-Silanes, Shleifer, Courts, 2003, *Quarterly Journal of Economics* 118, 2(1), 453-517	2.63 [IE] 5.25 [ES]
Judicial Efficiency Index	*LLSV (EJ)*	Efficiency and integrity of the legal environment as it affects business, particularly foreign firms.» (10 point scale, bad to good). Not available for Luxembourg, Slovakia and Slovenia.	La Porta, Lopez-de-Silanes, Shleifer, Vishny, Law and Finance, *Journal of Political Economy* , 1998, 106(6), 1113-1155	5.5 [PT] 10 [FI, NL]
Rule of Law Index	*LLSV (RL)*	Law and order tradition.» (10 point scale, bad to good). Not available for Luxembourg, Slovakia and Slovenia.	La Porta, Lopez-de-Silanes, Shleifer, Vishny, Law and Finance, *Journal of Political Economy* , 1998, 106(6), 1113-1155	7.8 [ES, IE] 10 [AT, BE, FI, NL]
Property Rights Index	*Heritage*	The extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively.» (100 point original scale; rescaled on a 10 point scale, bad to good). Contemporaneous values.	Heritage Foundation, Index of Economic Freedom https://www.heritage.org/index/	5 [IT] 9 [AT, DE, FI, IE, LU, NL]
Law and Order Index	*PRS*	"Law and Order" form a single component, but its two elements are assessed separately, with each element being scored from zero to three points. To assess the "Law" element, the strength and impartiality of the legal system are considered, while the "Order" element is an assessment of popular observance of the law.» (6 point original scale; rescaled on a 10 point scale, bad to good). Lagged values.	PRS Group/ICRG Political Risk Rating https://www.prsgroup.com/	6.67 [IT, SK] 10 [AT, FI, IE, LU, NL]
Rule of Law Index	*World Bank*	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.». (5 point scale from -2.5 to 2.5, bad to good). Two-year average lagged values.	World Bank, Worldwide Governance Indicators http://databank.worldbank.org/ (2014 update)	0.359 [IT] 1.966 [FI]

This table provides a detailed description of our variables. Panel A: ratings are measured every Friday; all other variables are weekly averages of daily values. Data source is Bloomberg. Panel B: data source as indicated. December values for PRS sourced from https://info.worldbank.org/governance/wgi/pdf/prs.xlsx. The ISO-Alpha 2 country codes are: AT-Austria, BE-Belgium, DE-Germany, ES-Spain, FI-Finland, FR-France, IE-Ireland, IT-Italy, LU-Luxembourg, NL-the Netherlands, PT-Portugal, SI-Slovenia, and SK-Slovakia.

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Appendix Table A2
Country variables
Appendix Table A2 Panel A. Variables, country breakdown

	Rating		*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*	
	2013-14	2011-12						2013-14	2011-12
Austria	AA+	AAA,AA+	3.52	9.5	10	9	10	1.835	1.808
Belgium	AA	AA+,AA	2.73	9.5	10	8	8.33	1.399	1.387
Finland	AAA,AA+	AAA	3.14	10	10	9	10	1.935	1.966
France	AA+,AA	AAA,AA+	3.23	8	8.98	8	8.33	1.415	1.476
Germany	AAA	AAA	3.51	9	9.23	9	8.33	1.626	1.612
Ireland	A,A-,BBB+	BBB+	2.63	8.75	7.8	9	10	1.725	1.765
Italy	BBB+,BBB,BBB-	A+,A,BBB+	4.04	6.75	8.33	5	6.67	0.359	0.399
Luxembourg	AAA	AAA	3.56	-	-	9	10	1.781	1.802
the Netherlands	AAA,AA+	AAA	3.07	10	10	9	10	1.825	1.812
Portugal	BB	BBB,BBB-,BB	3.93	5.5	8.68	7	8.33	1.036	1.035
Slovakia	A	A+,A	-	-	-	5	6.67	0.451	0.549
Slovenia	A-	-	4.26	-	-	6	7.5	0.975	-
Spain	BBB,BBB-	AA,AA-,A,BBB+,BBB-	5.25	6.25	7.8	7	8.33	1.020	1.167

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Appendix Table A2 Panel B. Correlation matrix

	2013-14						2011-12					
	Rating	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*Rating*	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*
DLLS	0.713						0.598					
LLSV(EJ)	-0.926	-0.804					-0.805	-0.849				
LLSV(RL)	-0.823	-0.804	0.875				-0.719	-0.887	0.943			
Heritage	-0.728	-0.527	0.746	0.641			-0.744	-0.488	0.759	0.672		
PRS	-0.551	-0.360	0.620	0.518	0.919		-0.606	-0.310	0.643	0.553	0.919	
World Bank	-0.750	-0.541	0.770	0.674	0.992	0.938	-0.735	-0.429	0.726	0.631	0.990	0.950

Appendix Table A2 Panel C. VIF between Rating and quality of law indicator

	2013-14						2011-12					
Rating with	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*
VIF	2.03	7.02	3.11	2.13	1.44	2.28	1.56	2.84	2.07	2.24	1.58	2.17
Tolerance	0.492	0.142	0.322	0.470	0.696	0.438	0.642	0.352	0.483	0.447	0.633	0.460

This table presents values for the country-level variables (Panel A), their correlation matrix (Panel B) and the Variance Inflation Factor between country ratings and the quality of law proxies (Panel C). In Panel A, values for the World Bank Rule of Law indicator are not reported during 2011-12 for country-years that are not included in the placebo sample. Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. "-" indicates missing observations. Further details on the explanatory variables are provided in Table A1.